



Bonneville Power Administration's Power Function Review

Corps of Engineers and Bureau of Reclamation
Operations & Maintenance Costs and
Capital Investments

Technical Workshop

March 15, 2005



BPA's Financial Disclosure Information

1. All FY '05-'09 information was provided in March 2005 and cannot be found in BPA-approved Agency Financial Information but is provided for discussion or exploratory purposes only as projections of program activity levels, etc.
2. All FY '97-'04 information was provided in March 2005 and is consistent with audited actuals that contain BPA-approved Agency Financial Information.



Power Function Review

Corps of Engineers and Bureau of Reclamation

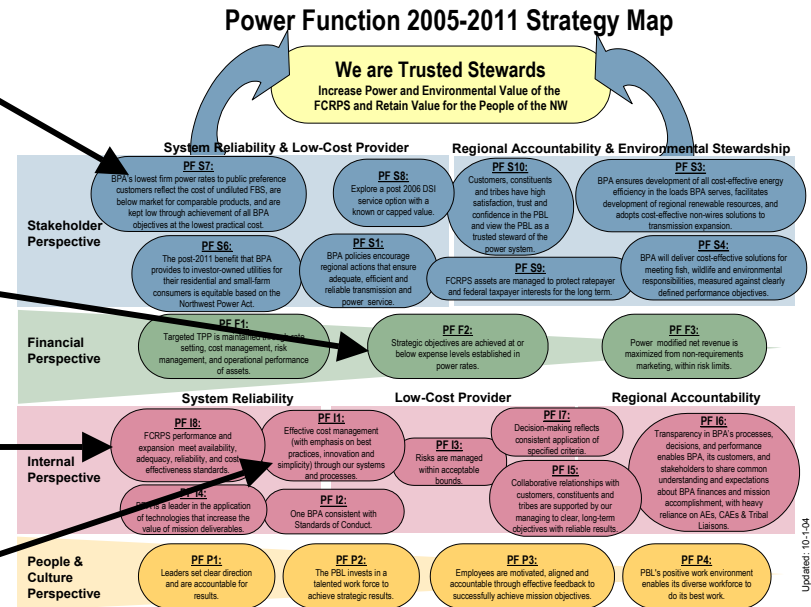
Support of PBL Balanced Scorecard

PF S7: BPA's lowest firm power rates to public preference customers reflect the cost of undiluted FBS, are below market for comparable products, and are kept low through achievement of all BPA objectives at the lowest practical cost.

PF F2: Strategic objectives are achieved at or below expense levels established in power rates.

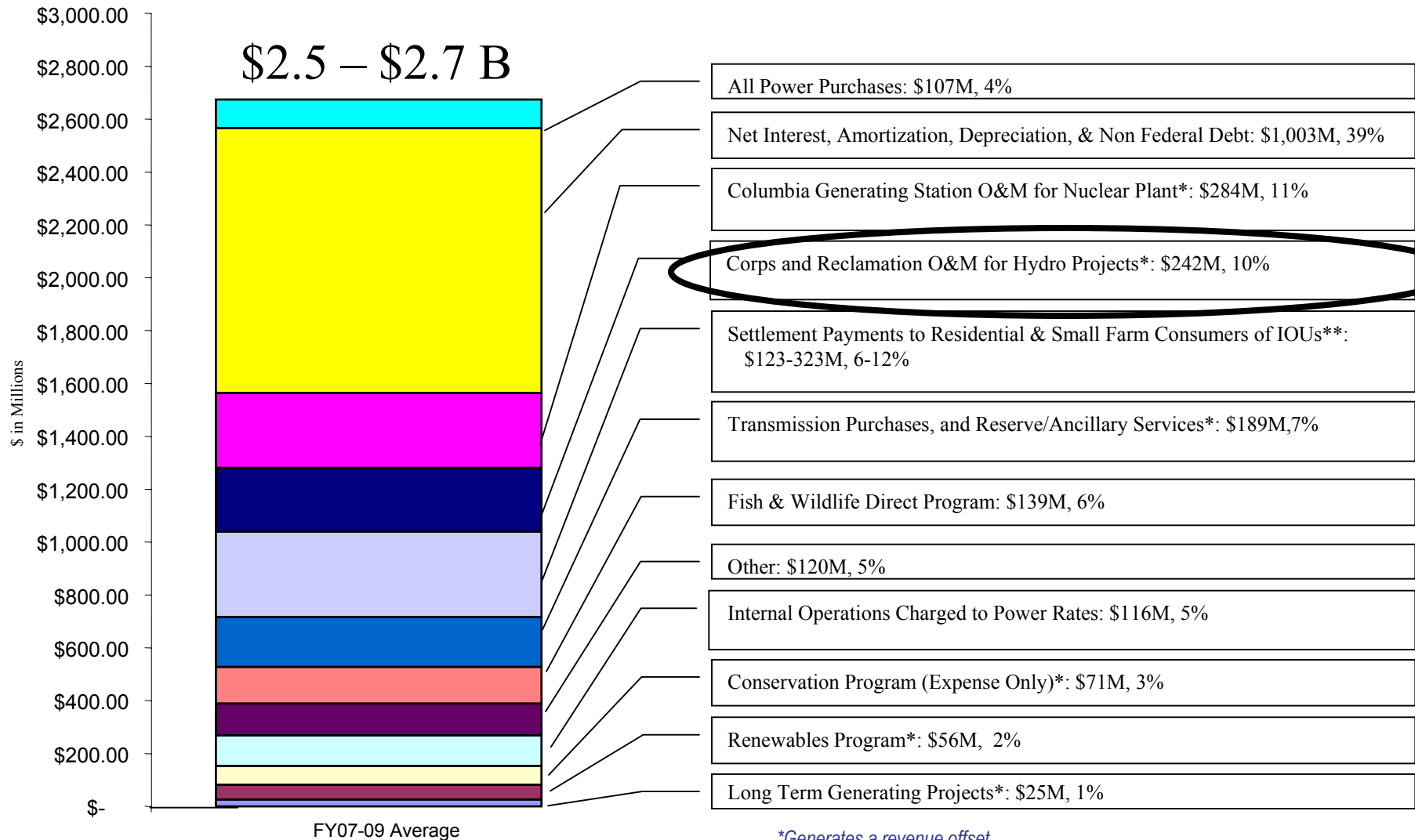
PF I8: FCRPS performance and expansion meet availability, adequacy, reliability, and cost effectiveness standards.

PF I1: Effective cost management (with emphasis on best practices, innovation and simplicity) through our systems and processes.





Components of the Forecasted Expenses In FY 2007-09



Note: See BPA's Financial Disclosure Information Page

**Generates a revenue offset*

*** This level is heavily dependant on forward market prices
Percentages may not add to 100% due to rounding*



Program Benefits and Results

- Improving unit **availabilities** and increasing **reliability**:
 - Developed Heavy Load Hour Targets
 - Reduced System Forced Outage Rate
 - Tracking lost generation due to spill
- Improving **system response** (voltage support, spinning reserves, NERC/WECC requirements, etc.)
- Increasing **generation efficiency** through machine upgrades or plant operation improvements
- Improving **maintenance practices**; shifting toward preventive maintenance as opposed to reactive/corrective activities:
 - Power Reviews
 - Implementation of maintenance management systems
- Developed regional partnership for decision making and program management



System Summary

- The Federal Columbia River Power System (FCRPS) consists of **31 hydroelectric plants** with **209 turbine-generating units**
- System generating capacity of **22,059 MW**; average generation of **78 TWh** (or 8,900 aMW)
- About **80%** of PBL revenue is from the hydro system
- The plants have as few as 1 unit and as many as 33 units (GCL)
- The individual generating units ranging in size from 1 MW to 805 MW
- The oldest units were put into service in 1909; the youngest in 2004
- Average cost of Corps/Reclamation Integrated Program is **\$311 million** (2003-2006)
 - O&M Program averages \$204 million
 - Capital Program averages \$107 million
- Employs about **1,600 O&M employees** working on:
 - Hydropower (power-specific and joint)
 - Fish & Wildlife O&M (joint)
 - Cultural Resources (joint)



Federal Columbia River Power System Generation

Will Have Map at Workshop



Program History

- In 1998, the **Cost Review Committee** recommended the development and implementation of an **integrated capital/asset management strategy** for the FCRPS. Other recommendations included:
 - Establish **Joint Operating Committees** to facilitate development and implementation of the strategy
 - **Benchmark** all aspects of FCRPS O&M and Capital against the industry
 - Adopt and implement “best practices”
 - Measure **performance** and report it publicly
 - Establish performance incentives and accountabilities to ensure success
- Also in 1998, Congress while referring to this recommendation, cited an estimate of annual cost savings and revenue enhancement, and directed BPA in cooperation with the Corps and Reclamation to develop an **“Asset Management Strategy”**
- This strategy was completed in June 1999 as a report to the U.S. Senate Committee on Appropriations



Program Milestones

- In 1994 and 1995, signed direct-funding agreements for **capital investments**
- In 1998 and 1999, began direct funding of **O&M**; agreements included provisions for developing **performance indicators** to measure performance
- Developed **coordinated multiple year budgets** for O&M (5-year basis) and capital (single investment budget through 2011); replaced uncertain and declining appropriations funding
- Created **Joint Operating Committees** and supporting groups with Corps/Reclamation
- Instituted **benchmarking**: all plants regularly benchmarked against equivalent North American hydro electric plants by HJA and Associates.
- Established **performance targets, incentives** and accountabilities
- Began measuring and **reporting** performance
- Signed over 150 **subagreements**; over 80 are on-going
- Has resulted in improved working relationships, enhanced collaboration and raised trust levels across the 3 agencies.



Program Management

(Moving from tactical to strategic through integrated asset management business model)

- Aggressive Cost/Performance management:
 - Regular JOC and workgroup meetings
 - Created workgroups to manage performance and cost for hydro O&M, capital investments, cultural resources, fish & wildlife O&M, performance measurement, and others
 - Monthly reporting: actual expenditures and obligations against budget targets, and other performance indicators
 - Looking forward to provide updated cost forecasts
 - Have instilled a shared awareness of fiscal goals
 - Seeking efficiencies in production and costs
 - Outage planning/coordination to maximize revenues



Program Development and Drivers

- Program developed because:
 - System old and aging
(median unit age = 48 yrs, 50% MW generated > 32 yrs)
 - Material condition of the equipment poor
 - Low levels of prior year investment
 - System performance expectations
 - Secure and stabilize funding for O&M and capital
 - Need for known forecasted expenditures for program
 - Improved working/business relationship between agencies through the Joint Operating Committees, etc.
- O&M and Capital activities and priorities strategically guided through the coordinated budget and planning process (Integrated Business Management Model)
- Seeking cost efficiencies through budgetary performance targets, incentives, and other program management initiatives.

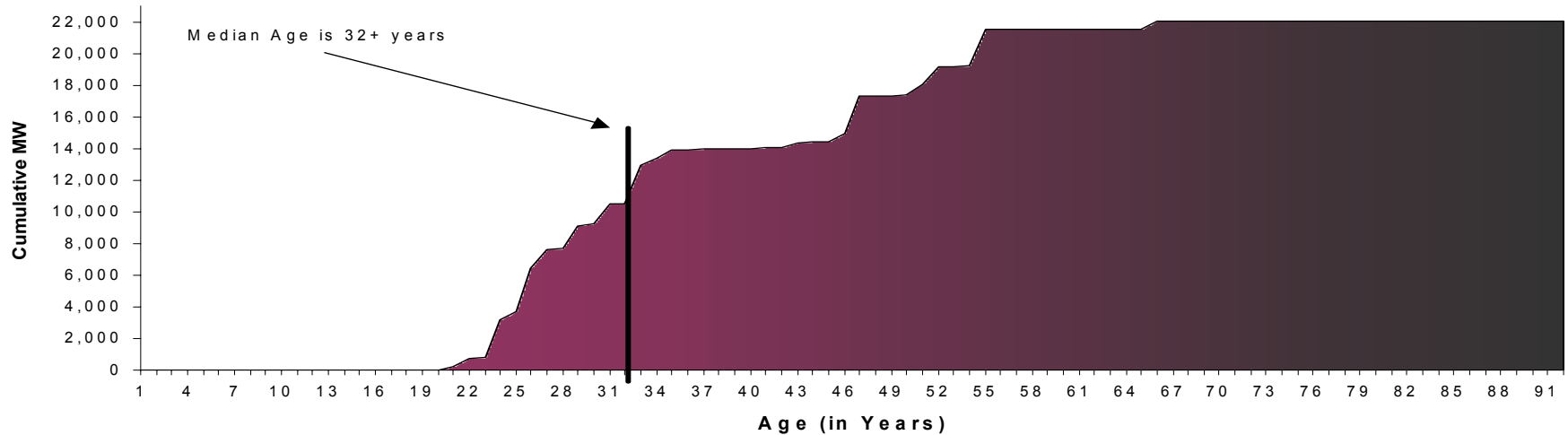


Age of the System

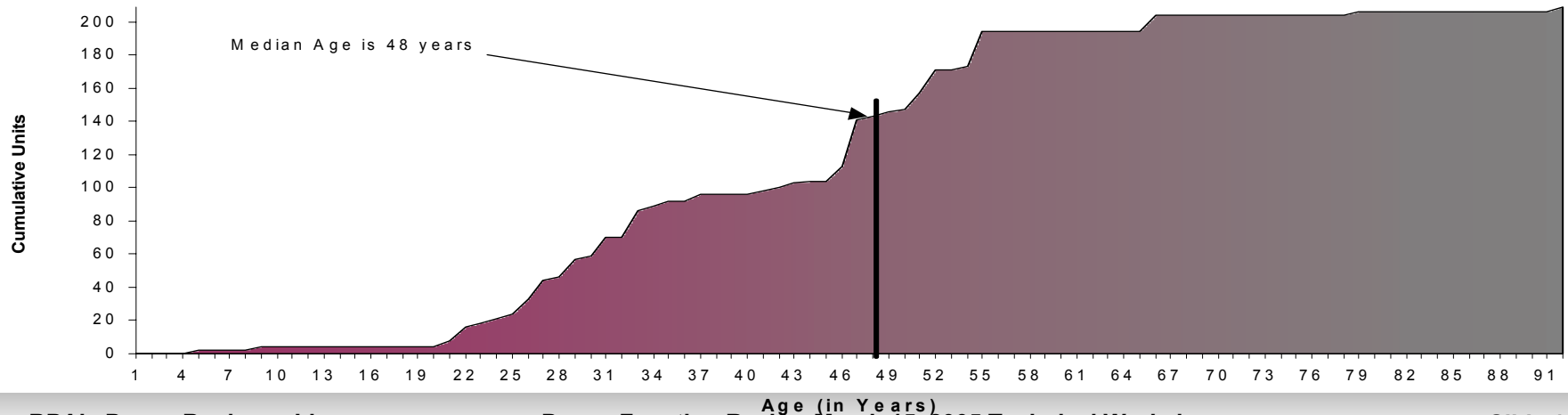
The system is old; capital investment needed

AGE OF SYSTEM: The FCRPS is aging, with 50 percent of its MW being 32+ years old or older; the median unit age is 48 years.

Age of FCRPS Hydro Capacity (MW)



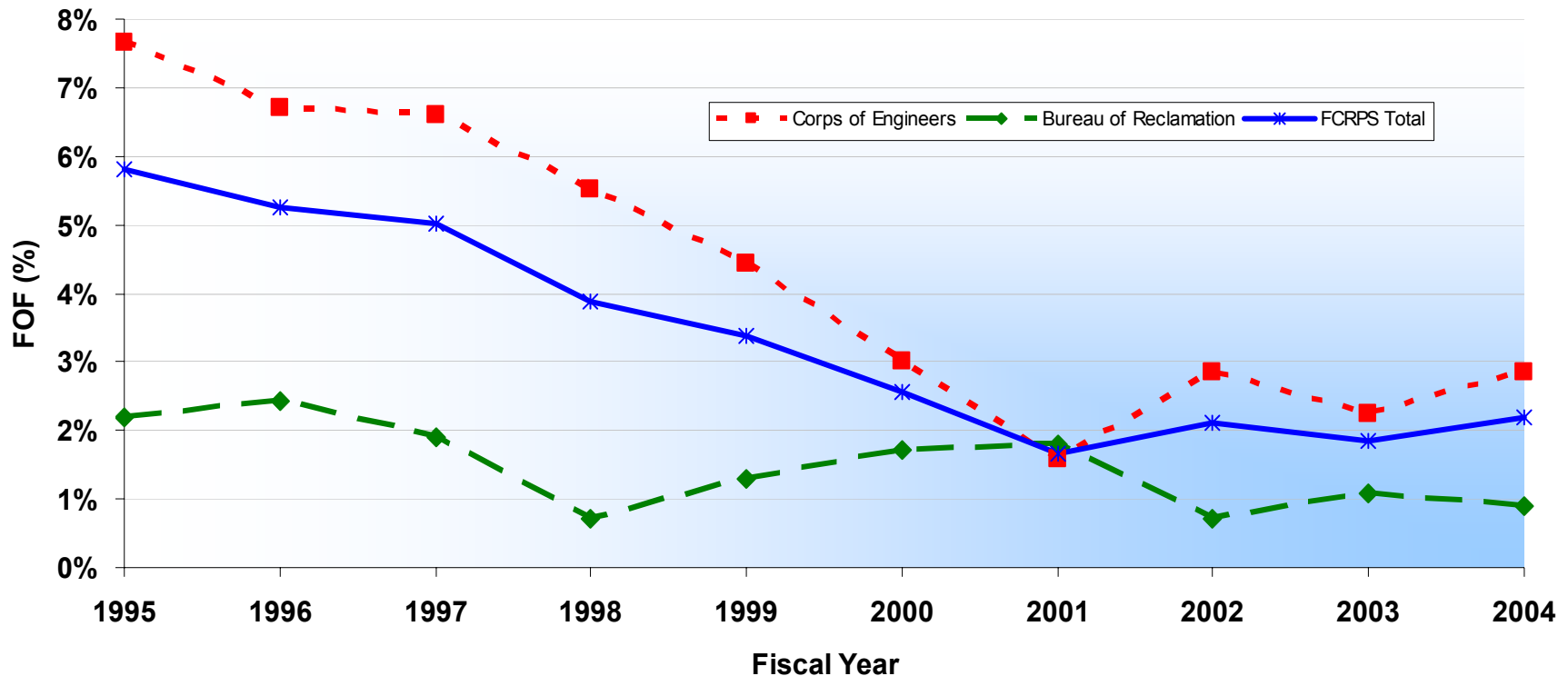
Age of FCRPS Hydro Units





Forced Outage Factors (Adjusted)

Costly maintenance (reactive vs. preventative); investment decisions made based on the value of availability



Notes:

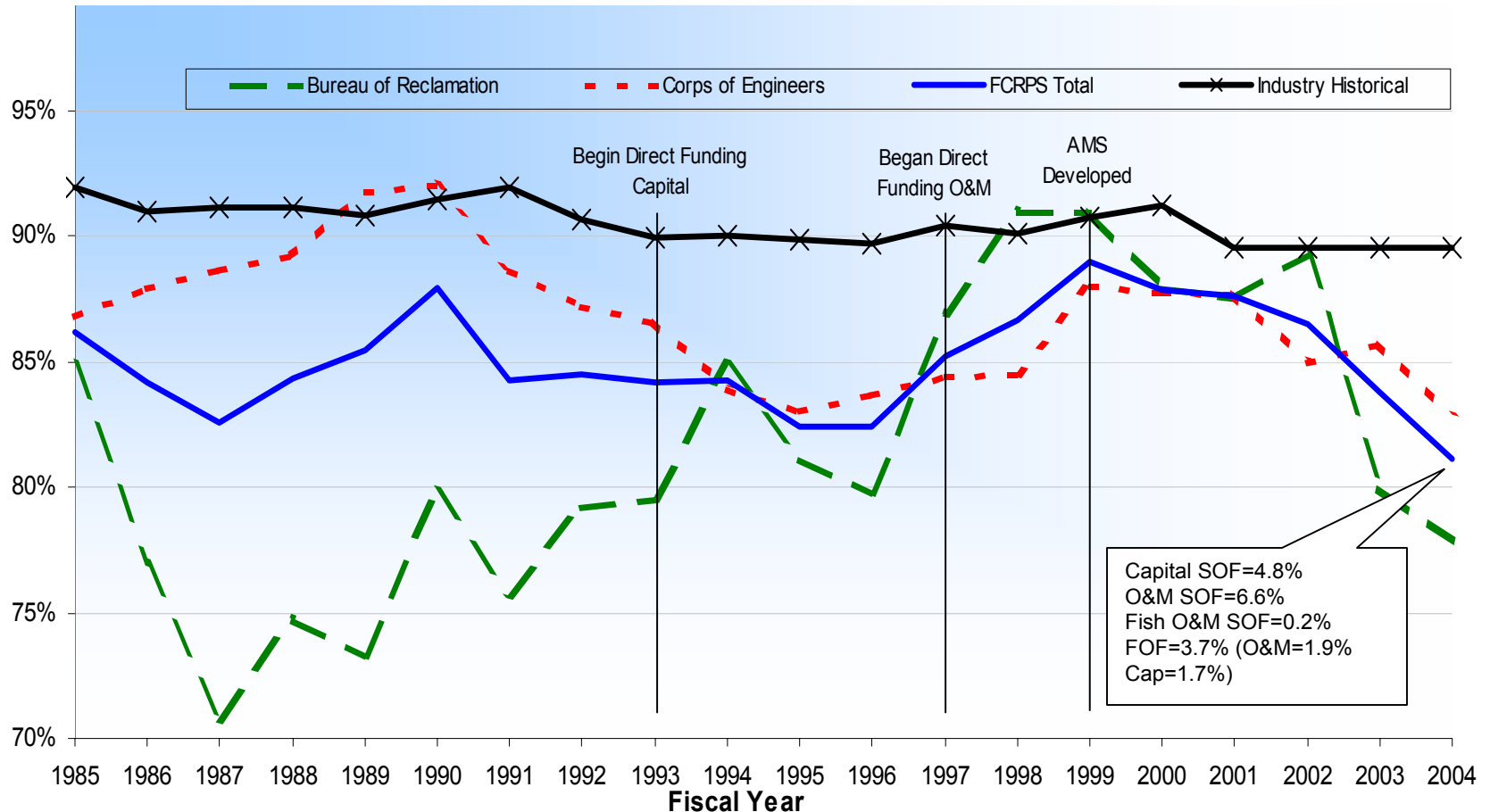
--- **Two of 21 Corps projects** had FOFs adjusted by removing outages associated with maintenance decisions. The affected plants were The Dalles and Lower Granite.

--- **None of the 10 Reclamation projects** had any adjusted FOFs.



Unit Availability

History of degradation; maintenance and capital investment required





Asset Management Strategy Goal and Objectives

- Asset Management Strategy Goal was to “maximize the value of the FCRPS.”
- The strategy identified two objectives for the FCRPS:
 - Establish a level of investments necessary to restore reliability of the system to industry standards or better.
 - Assess the ability of the system to enhance revenues by \$50 million annually through efficiency gains or cost reductions.
- The strategy also included several more specific O&M actions necessary to meet these objectives:
 - Consider fish related maintenance impacts (fish O&M higher priority than hydro/causes additional wear and tear on cranes, hoists, etc. than they were designed for. (In general, fish passage plants have higher forced outage factor than non-passage plants)
 - Plan for employee Attrition, Training and Career Development
 - Implement new technologies and Maintenance Management Systems
 - Refine outage planning and coordination
 - Review business processes for efficiencies and enhance communication
 - Enhance system performance indicators



Integrated Business Management Model

Performance Assessment

Tracking Results

- Progress towards meeting performance targets
- Forecast for getting back on target

Products

- Monthly reports
- Periodic reviews

2. Next

Resource Management

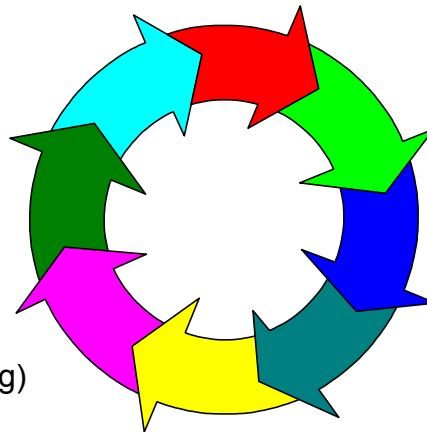
Allocating Resources

- Budgeting
- Program integration (asset planning)
- Managing to the plan

Products

- Annual budgets
- Capital work catalog
- Staffing plans
- Outage plans

1. Initial focus here



Strategic Planning

Defining Direction

- What is our business?
- What is our view of the market (landscape)?
- What are our business goals?
- Risk strategy
- Performance expectations

Products

- Business strategy

3. Current

Asset Planning

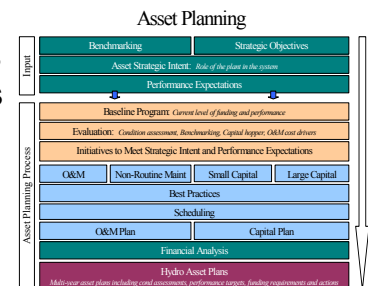
Describing Actions

- Strategic intent (role) of each plant
- Internal and external risks
- Performance targets
- Action plan for achieving expected performance

Products

- Condition assessments
- Resource requirements
- Asset plans

4. Future





FY05 O&M Budgets

Attachment A

Exhibit B Page 1 of 1
Bonneville Contract No. 96MS-95129
Reclamation Contract No. 1425-6-AA-10-01150

**FY 2005 ANNUAL POWER BUDGET
(NO CARRYOVER, UNLIQUIDATED DUE-OUTS, & PERFORMANCE AWARDS)
DIRECT FUNDED BY BPA (\$'S IN 1,000'S)**

FY 2005 Object Codes	SALARIES & BENEFITS	SUPPORT SERVICES & CONTRACTS	MATERIALS & SUPPLIES	OTHER 2/	EXTRA- ORD. MAINT.	REPL. & ADDT.	SUB TOTAL	UNLIQ. OBLIG.	GRAND TOTAL	POWER % OF M/P RAX 3/
	1xxx	25xx	26xx							
GENERAL COORDINATION 1/ Performance Incentive Awards 5/ BOISE	385	60	45	190	0	0	680	0	680	
Transmission	1,527	948	182	600	255	135	3,647	0	3,647	224
FY 04 Rescheduled Items	195	56	33	92			376	0	376	
Expensed Totals	1,722	1,004	215	692	255	135	4,023	0	4,023	
Small Capital Investments							150	150	150	
BOISE TOTAL	1,722	1,004	215	692	255	285	4,173	0	4,173	224
COLUMBIA BASIN	21,635	2,173	3,353	8,926		900	36,987	0	36,987	
Transmission	2,403	559	441	601			4,004	0	4,004	
Leavenworth Fish Hatchery				3,695			3,695	0	3,695	
Cultural Resources 4/				1,172			1,172	0	1,172	
FY 04 Rescheduled Items							0	0	0	
Visitor Arrival Center						900	900		900	
Repl3PP CO2 Cooling System						400	400		400	
Expensed Totals	24,038	2,732	3,794	14,394	0	2,200	47,158		47,158	2,916
Small Capital Investments							350		350	
COLUMBIA BASIN TOTAL	24,038	2,732	3,794	14,394	0	2,550	47,508	0	47,508	2,916
HUNGRY HORSE	1,044	172	559	623		111	2,509	0	2,509	0
Transmission	78	4	4	15			101	0	101	
Cultural Resources 4/				216			216	0	216	
FY 04 Rescheduled Items							0	0	0	
Expensed Totals	1,122	176	563	854	0	111	2,826	0	2,826	
Small Capital Investments							0		0	
HUNGRY HORSE TOTAL	1,122	176	563	854	0	111	2,826	0	2,826	0
MINIDOKA	2,700	600	450	1,000		527	5,277	0	5,277	0
Transmission	250	20	6	60			336	0	336	
FY 04 Rescheduled Items							0	0	0	
Expensed Totals	2,950	620	456	1,060	0	527	5,613	0	5,613	
Small Capital Investments							130		130	
MINIDOKA TOTAL	2,950	620	456	1,060	0	657	5,743	0	5,743	0
YAKIMA	851	275	106	520		475	2,227	0	2,227	0
Transmission	129	26	24	60			239		239	
FY 04 Rescheduled Items					0	0	0	0	0	
Expensed Totals	980	301	130	580	0	475	2,466	0	2,466	
Small Capital Investments							0		0	
YAKIMA TOTAL	980	301	130	580	0	475	2,466	0	2,466	0
ROGUE RIVER, GREEN SPRINGS	301	51	23	155	30	115	675	0	675	
Transmission	31	11	13	11			66	0	66	
FY 04 Rescheduled Items					0		0	0	0	
Expensed Totals	332	62	36	166	30	115	741	0	741	0
Small Capital Investments							60		60	
GREEN SPRINGS TOTAL	332	62	36	166	30	175	801	0	801	0
Expensed Totals	31,144	4,895	5,194	17,746	285	3,563	62,827	0	62,837	3,140
Small Capital Investments	0	0	0	0		690	690	0	690	
GRAND TOTAL (including Awards)	31,144	4,895	5,194	17,746	285	4,253	63,517	0	63,517	3,140

1/ General Coordination is shown for information only. It is spread to each project on a 10% per powerplant basis.

2/ Other consists of travel, training, rent, utilities, blanket purchase agreements, multipurpose expenses allocated to power, maintenance & service agreements, indirect overhead, and PN Coordination activities.

3/ This column represents the dollar amount of BPA's share of the Multi-purpose RAX items.

4/ Cultural Resources is computed at 92.054% (reallocation of power) for Grand Coulee and 69.87% (allocation of power) for Hungry Horse from Bonneville Power Administration.

5/ This line represents the dollar amount of performance awards (anticipated to be) earned in FY 2004 and paid in FY 2005.

Date: _____
Michael E. Alder
Program Manager - Operations & Maintenance
Co-Chair, Joint Operating Committee
Bonneville Power Administration

Date: _____
Terrald E. Kent
Program Manager - Facility Operations & Maintenance
Co-Chair, Joint Operating Committee
Bureau of Reclamation

FY05 Corps Annual Power Budget table
will be shown at upcoming Workshop

Note: See BPA's Financial Disclosure Information Page



System Overview:

FY 2005 FCRPS Performance Indicators

February

	Status (YTD)	Indicator	Measure	Owner	Rating Thresholds		
					Stretch	Mid	Minimum
Production	101%	HLH Availability	Actual HLH MW available divided by HLH MW planned (Chief Joseph, McNary, John Day, The Dalles, Bonneville, Lower Granite, Little Goose, Lower Monumental, Ice Harbor, Dworshak, Libby, Grand Coulee, and Hungry Horse only)	Performance Committee	99%	97%	94%
	383	Lost Generation Spill	Generation spilled due to unit unavailability (MWH) (Albeni Falls, Willamette Valley, Lost Creek, Southern Idaho, Chandler, Roza, and Green Springs only)	Performance Committee	Trend Only		
	96%	Outage Coordination	Percentage of Thursday calls attended	O&M Sub-Committee	100%	95%	90%
	2	Incremental Efficiency Acquired	Number of new runners installed and units returned to service at Grand Coulee	Capital Workgroup	5	4	3
Financial	87%	O&M Expenditure Rate	Actual O&M expenses divided by planned O&M expenses for the latest Annual Power Budget	O&M Sub-Committee	94%	96%	100%
	107%	Capital Expenditure Rate	Actual expenditures divided by planned expenditures (Evaluated 1/3 for mid-year performance, 2/3 for end of year performance)	Capital Workgroup	95%	90%	85%
Asset Condition		Preventative Maintenance Rate	Percent of Critical Preventative Maintenance work orders completed	O&M Sub-Committee	Trend Only		
	14%	Equipment Condition	Percentage of power train equipment with a hydroAMP Tier 1 condition rating	Capital Workgroup	100%	95%	90%
Safety	1.1	Lost Time Accident Rate	Number of lost time accidents per 200,000 person-hours	Performance Committee	1.5	1.7	2.0
Grid Supt.	Developing 3 Agency Program	WECC Requirements	Percent of time WECC reliability standards applicable to generators are met	Technical Coordination Committee	100%	N/A	N/A
Stewardship	1/1	Cultural Resources Stewardship	Number of key Milestones met for implementation of the FCRPS cultural resources program (Total = 16)	Cultural Resources Committee	16	13	10
	0	Fish Screen Reliability	Forced unit-hours out of service	Fish and Wildlife Committee	250	350	450

Contact Performance Committee - Clune, Kent, Krahenbuhl

Data Thru December



Three Agencies Working Together

Our Vision:

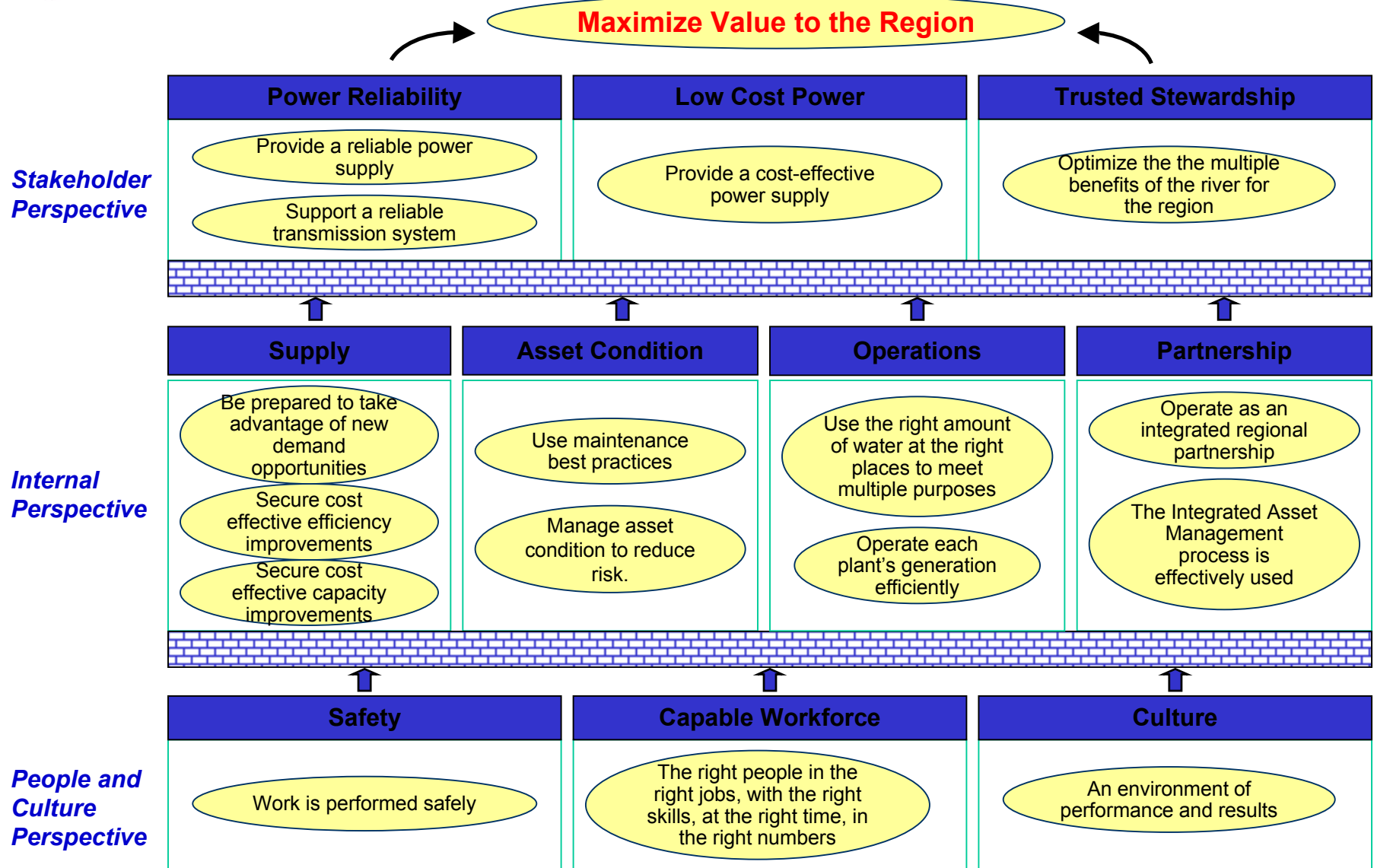
“Maximize the value of the river for the people of the Pacific Northwest.”

Our Premise:

“There is more potential for increasing value, if we operate with a common set of objectives, strategies and greater trust/collaboration.”



FCRPS Hydro Strategy Map





FCRPS Balanced Scorecard

STAKEHOLDER PERSPECTIVE

Will be shown at upcoming Workshop

INTERNAL PERSPECTIVE

Will be shown at upcoming Workshop

INTERNAL PERSPECTIVE

Will be shown at upcoming Workshop

PEOPLE & CULTURE PERSPECTIVE

Will be shown at upcoming Workshop



Process Study Findings: Current Situation

- Long term system health depends on Asset Planning, yet it is at a nascent stage:
 - There is no ongoing, deliberate alignment of strategies related to power generation across the FCRPS agencies
 - It is widely perceived at a middle management level across the three agencies that the planning and spending focus is primarily short-term, and that a long term, life-cycle view of assets is not systematically factored in
 - Conceptual link between Asset Plans and Business Planning does not exist outside the Strategy team of the JOC – hence, Asset Planning is not well understood or valued
 - At no point in the budget or capital approval processes are equipment risk, financial factors, power and non-power missions simultaneously traded-off across plants, districts, areas, agencies or lines of business – and the value of doing so is not yet universally understood



Process Study Findings: Risks of Current Situation

- If an asset's long-term value to the region is not well-understood, this can result in poor presentation of priorities, resulting in short-term decision making that can restrict future options
- Lack of a system-wide view of the costs and values of assets can result in sub-optimization of spending across plants, districts, areas, or lines of business
- In the absence of a mechanism to fully incorporate long-term asset intent, value and cost into current budgets, spending requirements can be pushed into future years creating a bow-wave of need
- Lack of a life-cycle view may result in failure to achieve anticipated life and benefit of the asset, and in higher O&M costs and reactive capital outlays, ultimately compromising ability to meet long-term obligations



Operations and Maintenance Program

(Includes Fish and Wildlife O&M and Cultural Resources)



FY2005 Operations and Maintenance State of the Hydrosystem

Reclamation: O&M Program at baseline to maintain reliability and unit availability

- Plants have been updated, material condition generally is good.
- Maintenance has been a priority, focus on accomplishing preventative maintenance activities
- Historical funding has been adequate to maintain and improve maintenance practices

Corps: O&M Program below baseline to maintain reliability and unit availability

- Historic level of capital investments under appropriations lagged far behind industry averages (very little capital investment until recently; e.g . only \$8M in 1998).
- Historic level of appropriated funding for hydropower in competition with national priorities under a declining appropriation environment lagged far behind industry averages. This resulted in reactive or breakdown maintenance being the norm.
- Regional growth in BiOp requirements further strained the availability of appropriated funding for hydropower.
- Current focus is to shift from breakdown maintenance to preventative maintenance



O&M Program Workforce

- FY04 Corps Totals – 1170 FTEs:
 - On-Site – 910 FTEs
 - Off-Site – 260 FTEs
 - On-Site = Project Personnel
 - Off-Site = District/Division Support – Operations, Engineering, Fish Trap & Transport, Contracting, Fish Hatchery O&M, Planning, Cultural Resources, Programs & Project Management, Real Estate, & PowerPlant Trainee Program.

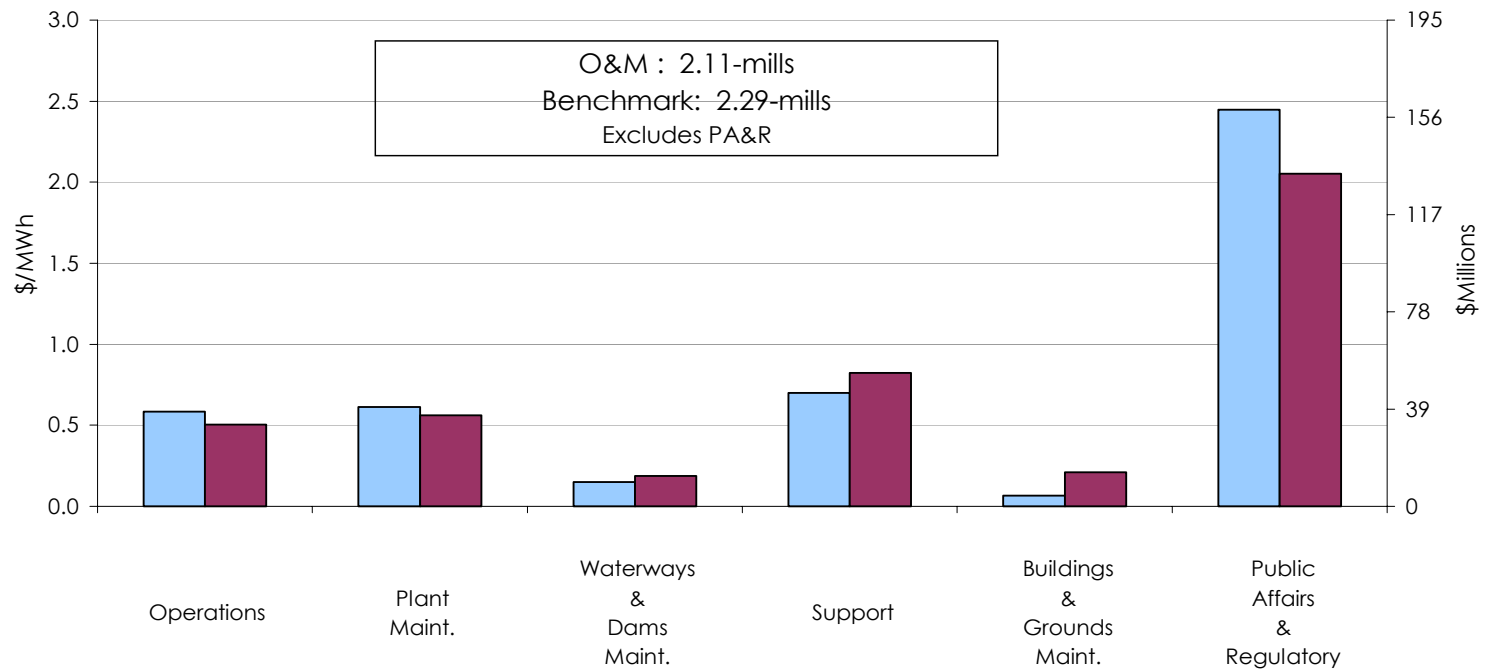
- FY04 Reclamation Totals – 431 FTEs:
 - On-site - 308 FTEs
 - Off-site - 123 FTEs
 - On-site = Reclamation staff located at the powerplant/field site.
 - Off-site = Reclamation staff located in Area, Regional, Denver and Washington Offices.



Cost Benchmarks - Expense

February 2005

* Includes Corps and Reclamation costs for hydropower, recreation and joint-use purposes, and BPA costs for coordination, planning, scheduling, dispatch, and fish & wildlife.



FCRPS Cost *	0.59	0.61	0.15	0.70	0.07	2.45
Benchmark	0.50	0.56	0.19	0.82	0.21	2.05
% of Benchmark	116%	109%	79%	85%	31%	119%
FCRPS Cost (\$000) *	44,394	46,545	11,347	53,038	5,020	185,649
% of Total O&M Cost	13%	13%	3%	15%	1%	54%

Contact - Performance Committee - Clune, Krahenbuhl, Kent

FCRPS Hydropower Program



Summary of O&M Benchmarking Results

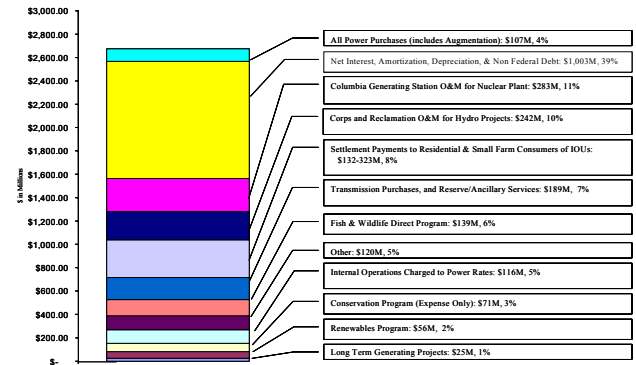
- Combined BPA/BOR/Corps cost benchmarks:
 - Operations costs are 116 percent of expected cost benchmark
 - Public Affairs and Regulatory costs are 119 percent of expected benchmark (BPA Fish Program expenses, as well as Corps/BOR Fish and wildlife O&M are included here)
- BOR/Corps generating plant cost benchmarks:
 - Maintenance costs are 109 percent of expected benchmark
 - Waterways and Dams Maintenance costs are 79 percent of expected benchmark
 - Support costs are 85 percent of expected benchmark
 - Building and Grounds Maintenance costs are 31 percent of expected benchmark
- *Note:* Of total O&M benchmarked costs of 4.56 mills, BOR/Corps O&M cost = 2.70 mills and BPA cost = 1.86 mills



FY07-09 Power Expenses

Corps and Reclamation O&M for Hydro Projects

	FY97-01 Average	FY02-06 Average	FY07-09 Average
Program Level	\$146M	\$196M	\$242M
Increase/Decrease		\$50M	\$46M
% Increase		34%	23%

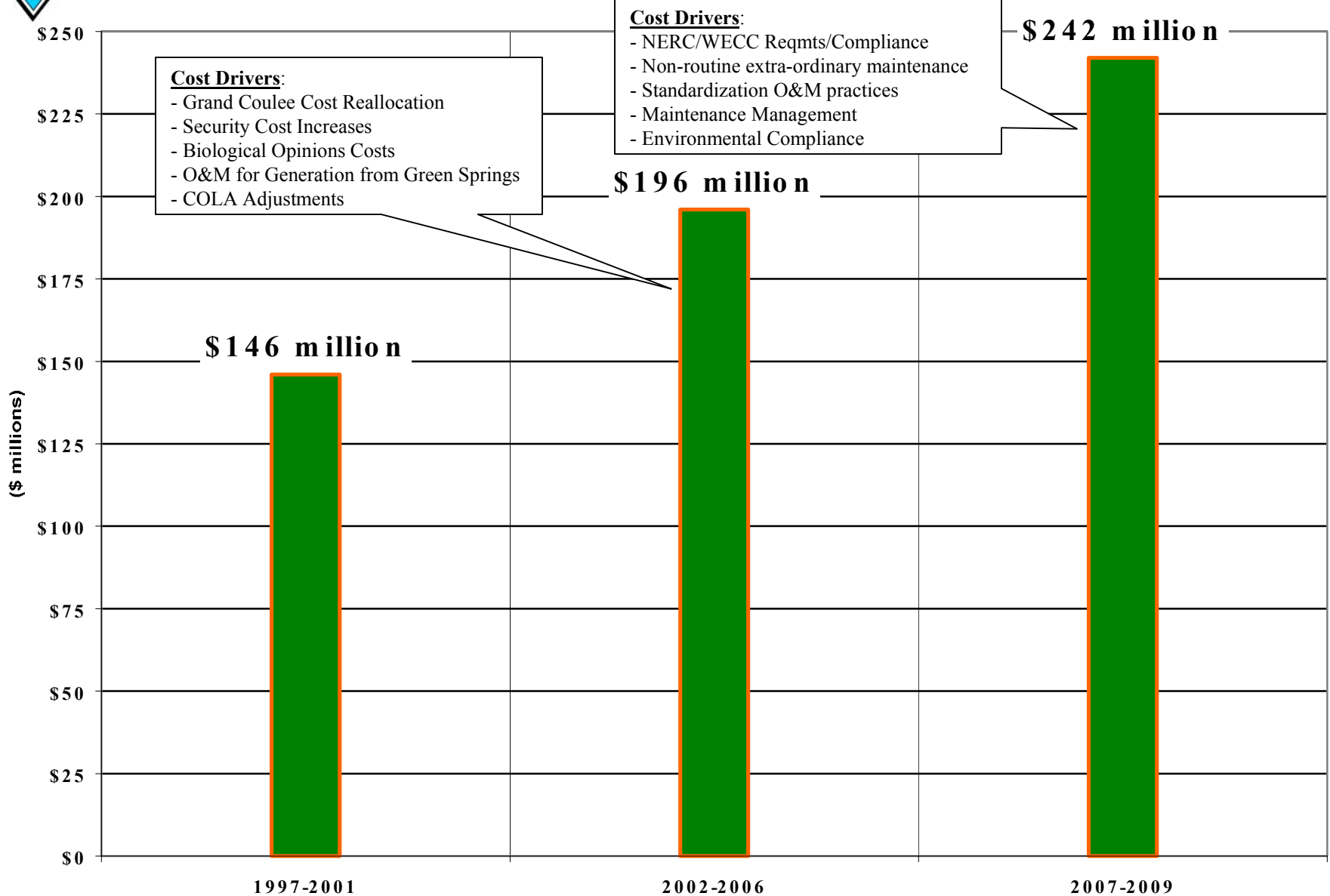


	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Reclamation O&M Expense Total	63,300,000	65,000,000	71,654,000	74,760,000	77,766,000
Corps O&M Expense Total	144,505,000	148,747,000	163,019,000	167,242,000	171,907,000
 Total O&M Program Expense	 207,805,000	 213,747,000	 234,673,000	 242,002,000	 249,673,000

Note: See BPA's Financial Disclosure Information Page



Average Costs





Major Cost Drivers in O&M Budgets 1997 to 2006

- Regulatory or Mandated:
 - Grand Coulee cost reallocation: Increased costs allocated to power from 70 percent to 92 percent (\$6.8M/yr)
 - Reclamation indirects increased 4% in FY 2001 and increased 2 percent in FY 2004 (\$1.8M)
 - Allocation of fish and wildlife O&M costs to budget (\$11.3M/yr)
 - Additional security (\$6.6M/yr)
- Revenue Related:
 - O&M costs for new generation from Green Springs (\$0.6M/yr)
 - Initial Corps direct funding agreement: (\$10M/yr)
 - Labor: For the 1997 to 2009 period, labor costs to cover staff account for about \$55M of the O&M cost increases.

Earlier cost forecasts, based on the Cost Review, had not benefited from updated material condition information or benchmarking results

Trades and Crafts/GS labor costs increase at 3 % to 5% per yr compared to budgets increasing at 3 percent/yr overall. For 1999-2003, this equates to ~\$1M/yr shortfall to cover labor costs



Drivers of Change 2007-2009

- Regulatory or Mandated:
 - \$2.5+M/yr. NERC/WECC Requirements/Compliance
 - \$2M+/year: Maintenance Management Systems (implementation of systems mandated by the Department of Defense)
 - \$3M/yr: Environmental Compliance/BiOp (implementation of EMS mandated by EPA/Corps Headquarters)
- Revenue Related:
 - \$8M/yr+ Non-Routine Extraordinary Maintenance: Corps need is \$15M+/yr average; Reclamation is \$2M to \$3M/yr over base program
 - \$2M+/year: Standardization of O&M practices with Power Review Program, HydroAmp, hydraulic steel structure inspection, training, and GDACS
 - Labor: For the 1997 to 2009 period, labor costs to cover staff account for about \$55M of the O&M cost increases.

Note: ~ 70% to 75% of O&M program costs are labor, indirects, and materials and supplies result in the assumption of 3%/yr increase in base program



Opportunities for Efficiencies or Reductions

- FCRPS Process Improvements
- E-procurement and reverse auctions for materials and supplies
- Opportunities to further remotely operate feasible plants
- Full implementation of maintenance management system (FEMS/MAXIMO)
- Note: Reclamation baseline efficiency improvements completed; Grand Coulee staff reduction, Southern Idaho SCADA replacement, multi-crafting, refined maintenance techniques
- PPEI: Partially funded through expense budget at \$500-\$800K/year through 2009. Through 2004 have added 80+ aMW worth \$24M/year in revenue based on average water at \$35



Risk

- WECC/NERC compliance requirements
- Security Costs Risks: Cost forecasts are based on current threat level. If threat level goes up, security costs could increase significantly
- Environmental compliance requirements
- BiOp: Requirements of BiOps (including Willamette) are still unknown, but likely would increase costs
- Impacts to system performance: Increase in Forced Outage Rate, reduced availability, loss of reliability and associated generation/production
- Grid West Development



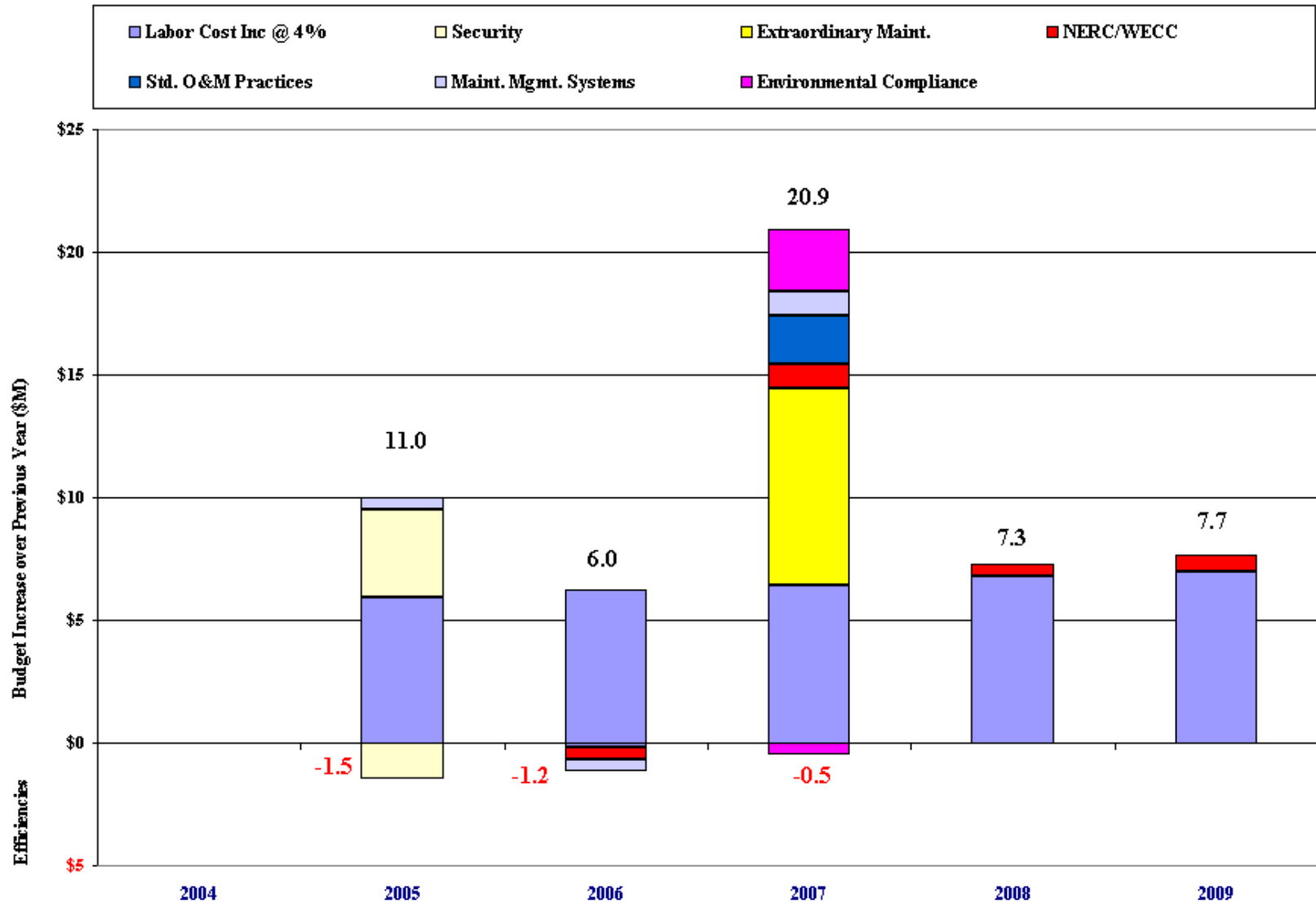
Budget Actuals and Forecasted Resource Requirements (FY 2005-2009)

	2002	2003	2004	2005	2006	2007	2008	2009
O&M Budget	184.2	183.2	196.8	207.8	213.8	234.7	242.0	249.7
Increase Over Previous Year				11	6	20.9	7.3	7.7
Initiatives:								
Labor Cost Increase @ 4%				5.9	6.2	6.4	6.8	7.0
Security				6.1				
Extraordinary Maintenance						8.0		
NERC/WECC Requirements					0.5	1.0	0.5	0.7
Standardization of O&M Practices						2.0		
Maintenance Mgmt. Systems				0.5	0.5	1.0		
Environmental Compliance						3.0		
Labor/Initiatives Total				12.5	7.2	21.4	7.3	7.7
Deficit (Efficiencies)				-1.5	-1.2	-0.5	0.0	0.0

Note: See BPA's Financial Disclosure Information Page



Budget Actuals and Forecasted Resource Requirements (FY 2005-2009)





Rate Effect of O&M Program Increases

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Cumulative Annual O&M Program Increase (\$000)	\$5,000	\$14,300	\$17,100	\$35,300	\$51,100	\$50,100	\$63,700	\$74,700	\$80,700
Cumulative Rate Effect (FY97-06 \$65 million = 1 mill) (FY07-11 \$85 million = 1 mill)	0.08 mills	0.22 mills	0.26 mills	0.54 mills	0.79 mills	0.77 mills	0.98 mills	1.15 mills	1.24 mills
Lost Revenue w/o O&M Program Increases (\$000)	-\$46,000	-\$69,000	-\$92,000	-\$115,000	-\$138,000	-\$161,000	-\$184,000	-\$207,000	-\$230,000
Cumulative Rate Effect (FY97-06 \$65 million = 1 mill) (FY07-11 \$85 million = 1 mill)	-0.71 mills	-1.06 mills	-1.42 mills	-1.77 mills	-2.12 mills	-2.48 mills	-2.83 mills	-3.18 mills	-3.54 mills
Net Rate Effect	-0.63 mills	-0.84 mills	-1.15 mills	-1.23 mills	-1.34 mills	-1.71 mills	-1.85 mills	-2.04 mills	-2.30 mills



Non-Routine Extraordinary Maintenance Case Study 1

- The condition of McNary Project's turbine intake headgates has deteriorated to the point that their continued operation presents an unacceptable level of risk to the safety of project employees. The 45 headgates are original to the project and major repairs have not been made to the gates in over 50 years. Corrosion of the gates' roller chain has resulted in a situation where the chains can fail catastrophically without warning. Three gates per unit are required for turbine intake closure to allow for dewatering of a unit for maintenance. Since using the existing headgates is not a viable option, scheduled unit outages for preventive maintenance will potentially be impacted and there are likely to be some unscheduled forced outages (historically 3 to 4 per year) that will affect unit availability.
- The long term plan is to rehabilitate all 45 gates over a 4 year period (FY07-FY10) for a total of \$7,839,000.
- An interim plan has been developed to attempt to offset the potential risk of headgate related outages. Inspection of chain is ongoing. Chain replacement materials have been ordered. Crews are currently working on minor remedial repairs to a small number of gates that are in the best condition. Once materials arrive onsite, crews will shift to complete headgate rehabilitation on a total of 7 gates in FY05 and FY06. Availability of funds has limited the number of gates that can be rehabilitated under the interim plan.

FY05 Funding = \$1,001,893 FY06 Funding = \$1,002,500

Unit Availability Impact:

If headgates are not repaired, then turbine units cannot be unwatered for maintenance and repair. This will result in lengthy forced unit outages. FY05 and 06 scheduled unit outages that could be affected by headgate unavailability are: Unit 6 (periodic removal of water from the runner hub), fish screen biological studies for the McNary Modernization Program, Unit 6 generator rewind, and main unit preventive maintenance and unit overhauls.

Revenue loss due to single unit: Annual = \$8,648,103 One month = from \$30,000 to \$1,887,000



Non-Routine Extraordinary Maintenance Case Study 2

- On June 5th 2004, Unit #9 at Chief Joseph Powerhouse was taken out of service when the unit overheated and the turbine pit flooded. Initial findings show that the lantern ring was charred and in pieces, some of the packing is fused together, the shaft packing sleeve is corroded and is missing the Babbitt plug over keys, and finally, the guide bearing is damaged. The project doesn't have any spare lantern rings or shaft sleeve. Water flooded the turbine pit and was mixed with oil. Accordingly, the Washington Department of Ecology notified and dispatched their "spill responder". No oil was released to the river.
- Corrosion caused growth/failure of key material inside the keyway, forcing the sleeve split to open up. The edges of the split caught the packing material and pulled the packing out of position, thus entangling the lantern ring and/or restricted cooling water flow, which precipitated the failure. The project is currently developing a plan to check all other units for similar symptoms.
- The repair will require removal of head cover and turbine shaft (unstack Unit) to replace the packing sleeve, lantern ring and the guide bearing. The Hydropower Design Center has been contacted. The project is working on a more detailed report. The COE is in process of awarding a contract for this work

O & M funds expended for initial response: \$ 20,000

Investigation of cause and develop contract package \$ 120,000

Contract, Engineering during Construction, Contract Supervision and Administration \$ 535,000

Total Estimated Cost: \$675,000

FY05 Lost Revenue: \$850,000 to date, ~ \$38,000/mo for remainder of this low water year. For average water, lost revenue this unit is ~ \$4.64M/yr.



Reclamation Efficiency Improvements

Snake River Area Office Efficiency Improvements over the last 10 years:

- **Staff Reduction:**
 - Southern Idaho SCADA – Anderson Ranch, Black Canyon, Palisades, and Minidoka Powerplants were remotely operated in 1997. Operations staff prior to this point consisted of 5 Powerplant Operators and one Operations Work Leader at both Palisades and Minidoka. Those plants reduced their local operations staff to 1 Powerplant Operator per facility. Later, a Communications and Instrumentation Mechanic was hired at each facility to maintain the electronic equipment, which consists of much more than the SCADA equipment, and is growing as old equipment is replaced. Even if you include the C&I Mechanic Position, SCADA control resulted in a decrease of 4 operations positions in each of the two facilities, with a savings of approximately \$700k per year. Anderson Ranch and Black Canyon were remotely operated since 1984, so the 1997 project did not result in further staff reductions at those facilities.
- **Maintenance Staffing:**
 - Anderson Dam and Powerplant, a complex facility with a 450' high dam and two 20-MW units, is manned by a maintenance force of only three people, an Electrician/Work Leader, Plant Mechanic, and General Maintenance Worker. The three positions handle local operations, maintenance, and emergency call-outs. This is the minimum size of staff for a plant of this size, and its benchmark rating has consistently been among the best in the industry.
- **Offices Combined:**
 - In 1994, the USBR offices in Burley and Boise were combined into the Snake River Area Office. This resulted in shared responsibilities between the two offices. For example, Safety, Hazardous Waste, Security, and Power Reporting and Scheduling, although located either at Boise or Burley, direct those programs area-wide. This has resulted in a savings of at least 5 positions, approximately \$300k per year.



Reclamation Efficiency Improvements

(Continued)

Grand Coulee Power Office:

- **Staff Reduction:**

- Following installation of SCADA to control Hungry Horse operations from Grand Coulee the Hungry Horse personnel FTE (full time equivalents) has decreased from an average of 19.5 per year to 16.5 per year:
- Grand Coulee personnel FTE information:
 - December 1992—483 personnel on board
 - FY '99—322 FTE's
 - FY '01—322 FTE's
 - FY '04—345 FTE's (Increased by 35 armed security guards (over FY '01) with 5 additional needed. Guard cost currently nonreimbursible).
- Other examples of increasing efficiency:

- **Multi-crafting:**

- At 2003 labor management negotiations, agreement was reached on combining the main mechanical crafts (Machinist, Pipefitter, Rigger, Equipment Operator, Boilermaker) into one craft, Hydromechanic. This will result in a more efficient operation by eliminating the strict jurisdictional barriers that previously existed.

- **Maintenance:**

- A change in frequency in cavitation damage repair to the Third Powerplant units is currently being made. The previous frequency was each unit every 4 years and this is being decreased to each unit every 3 years. The amount of damage is less, requiring less outage time. It is estimated this will save an average of 2.5 weeks per year of outage time; however early indication is that there will be more than an average of 2.5 weeks of outage time saved per year. It will also have a savings in manhours to actually perform the repair, however the amount of man hours saved will not be known until the cycle is completed.



Reclamation Efficiency Improvements

(Continued)

Yakima Field Office Efficiency Improvements over the last 10 years:

- **Staff Reduction:**

Yakima Washington reorganization— Roza and Chandler Powerplants were reorganized in 2002. Operations staff prior to this point consisted of 2 Supervisors and 7 Power System Journeymen. Those plants reduced their operations staff to 1 Supervisor and 5 Power System Journeymen combined. The powerplant supervisor is now responsible for both plants and the staff of 5 can support either plant as needed.



Corps Efficiency Improvements

Corps Maintenance Efficiency Initiatives:

- **Staff & Labor Cost Reductions:**

- Investigating potential cost savings of remoting the operation of Libby and Albeni Falls plants from Chief Joseph Project. This has the potential of reducing staff requirements for plant operators with labor savings estimated at \$600k to \$900k per year.
- Willamette Valley projects operate nine of thirteen projects remotely. Further refinements and expansion of remote operations are being investigated for additional labor efficiencies.
- Automating the spillway gate hoists at Albeni Falls will begin this spring. This will result in reduced over-time paid to crane mechanics with the old crane operated gates.

- **Training Efficiencies:**

- Large Capital projects like installation of GDACS at Chief Joseph project were accomplished using a combination of journey-level and Hydropower Plant Trainees to offset operational labor costs and provide valuable training for staff that will maintain the new equipment.
- Use of community colleges to accelerate power plant apprenticeships and reduced training costs.



Corps Efficiency Improvements

(Continued)

Corps Maintenance Efficiency Improvements:

- **Applications of New Technology:**

- Use of Infrared cameras to detect problems before equipment fails to reduce forced outages.
- Replacement of old air blast main unit breakers with gas insulated breakers reducing maintenance from 40 to 60 hours per year to just two days every ten years.
- Installed new digital protective relays with self diagnosis of failures and no maintenance.
- Replacement of DC generators with solid state excitation systems with self diagnosis of failures and no maintenance.
- Developed and installed 3-D cams that facilitate operation within 1% of peak efficiency aiding fish survival and reducing cavitation damage to turbine blades.
- Developed and implemented a Generic Data Acquisition & Control System for full control of software changes to maximize efficiency, greater efficiency in system support, load distribution and system security.

- **Risk Reduction:**

- Relocated critical electrical components away from potential damage zones around breakers to prevent total power production losses from single point failures.



Corps Efficiency Improvements

(Continued)

Corps Maintenance Efficiency Improvements:

•Columbia River Projects:

- Installation of 10 digital governors at Bonneville, estimate that it saves approximately 800 man-hours of labor per year.
- Installation of 10 digital excitation systems at Boneville, estimate it saves approximately 1200 man-hours of maintenance per year.
- Installation of new power transformers at Bonneville, estimate a savings of approximately 400 man-hours per year.
- Installation of SF6 breakers at Bonneville, estimate a savings of 500 man-hours per year.
- Installation of SF6 breakers at The Dalles, estimate a savings of 1600 man-hours per year.
- Installation of digital exciters at John Day, estimate a savings of 1200 man-hours per year.
- Rehab of generators and turbine replacements at Columbia river projects, estimate a savings of 8000 man-hours.
- Rehab of project cranes at all Columbia river plants, estimate a savings of 4000 man-hours.
- Installation of new service station switchgear at Bonneville, estimate a savings of 100 man-hours per year.
- Implementation of FEM/Maximo at Bonneville, estimate a savings of 1000 man-hours at this time, will be more in the future.
- Regional Hydropower Test & Evaluation staff developed predictive maintenance protocols centered on condition assessments in lieu of fixed maintenance schedules.

This reduction of man-hours of labor per year has enabled workforce to devote more efforts toward executing the routine maintenance program. In 2003, roughly 47% of all routine preventive maintenance (PMs) was accomplished. In 2004, with implementation of new equipment, 67% of all PMs was accomplished.

Key Result: Lower Out of Service Time and Costs for Maintenance.



Corps Efficiency & Reliability Improvements

(Continued)

Corps Efficiency Improvements:

- **Energy Efficiency:**

- Partnered with BPA in performing energy audits to reduce energy and water consumption at hydropower facilities.
- Partnered with BPA on Hydropower Optimization Team initiatives to improve water use and power production through data accuracy, setting verifications, near real time operational capability and generator efficiency improvements.

Corps Reliability Improvements:

- **Generation Reliability:**

- Assessed effectiveness and adequacy of protection schemes to reduce nuisance tripping and ensure full generation capability.

- **Transmission Reliability:**

- Partnered with BPA to improve reactive voltage support at The Dalles and John Day using high side voltage control, synchronous condensing and reactive cross current compensation.
- Partnered with BPA on dynamic system model tests to optimize governor and excitation settings for optimum performance, protection and response of automatic voltage regulators, power system stabilizers, reactive capability limiters and governor frequency response.



Total FY04 System O&M Program Expense Costs by Category (\$187,640,924)

Materials and Supplies:

Office Supplies, IT materials and supplies transportation provisions, non-capitalized supplies of nuts, bolts, tools, materials, and parts used in the construction, repair, or production of supplies, equipment, building and other structures, etc., used in day-to-day operation of facilities.

(5%)
\$10,255,162

Materials & Supplies

Note: for Support Services and Contracts ~ \$15 million are fish/security related costs.

Support Services & Contracts

(19%)
\$34,569,097

Support Services & Contracts:

Guard services contracts, fish trap and transport contracts [hauling fish trailers w/ tractors and tugs], fish pump work, rip rap repairs, dissolved gas, fish counting, fish hatchery, non labor portion of MIPRS, grounds/building maintenance, professional/technical services, GSA contract autos, and equipment testing

(9%)

\$16,700,887

Other & Miscellaneous

Other & Miscellaneous:

(COE: utilities, travel, equipment rental, rental space, communication charges, information technology costs, etc)
(BOR: travel, training, rent, utilities, multipurpose costs and association overheads (e.g., dam and reservoir), etc)

Salaries & Benefits

(67%)

\$126,115,778

Salaries and Benefits:

Salaries and benefits and indirect overhead labor (COE: PCS)
(BOR: Regional and Area Office admin. Staff, region's share of system costs for finance, budget, payroll, IRM, legal, Departmental Assessments, etc).



Fish and Wildlife Operations and Maintenance And Cultural Resources Budgets: 2007-2009

Fish and Wildlife Operations and Maintenance:

	2005	2006	2007	2008	2009	07-'09 Average
Corps Fish and Wildlife O&M	34.3	35.2	37.7	36.9	36.0	36.9
Reclamation Leavenworth Hatchery	<u>3.8</u>	<u>3.9</u>	<u>4.2</u>	<u>4.4</u>	<u>4.5</u>	<u>4.4</u>
Totals:	38.1	39.1	41.9	41.3	40.5	41.2

Cultural Resources:

	2005	2006	2007	2008	2009	07-'09 Average
Reclamation Cultural Resources	1.0	1.0	1.0	1.0	1.0	1.0
Corps Cultural Resources	<u>2.5</u>	<u>2.5</u>	<u>2.5</u>	<u>2.5</u>	<u>2.5</u>	<u>2.5</u>
Totals:	3.5	3.5	3.5	3.5	3.5	3.5

Note: See BPA's Financial Disclosure Information Page



Program Challenges

- Preliminary Willamette BiOp costs were reconfigured to fit within base fish O&M program thru FY 2008 [*note: no BiOp yet*]
- Managed additional extraordinary maintenance expense costs within base O&M program thru FY 2006 (see appendix for detail)
- Cost increases associated with security
- Achieving maintenance best practices
- Developing methods to routinely assess equipment material condition
- Development of long-term asset plans for each plant (Asset Management Strategy II)
- Evaluating investment/risk tools [e.g., (HydroVantage) on Grand Coulee Transformers]:
 - 54 transformers, 6 age groups from 60 to 17 years old, recommendation: maintain 3 spares vs. replacement.



Capital Investment Program



Capital Investment Program – Types of Investments

- Generation Reliability (Asset Management Strategy Objective 1)
 - Operations and Maintenance – Small Capital
 - Generation Equipment Upgrades, Replacements and Refurbishments
 - Governors, Turbines, Generators, Exciters, Breakers, Transformers, Control Systems, Relays & Station Service and Miscellaneous
 - Powerhouse Auxiliary Equipment Upgrades, Replacements and Refurbishments
 - Cranes, HVAC, Dam/Flow Structures, Powerhouse & Grounds and Miscellaneous



Capital Investment Program – Types of Investments

(Continued)

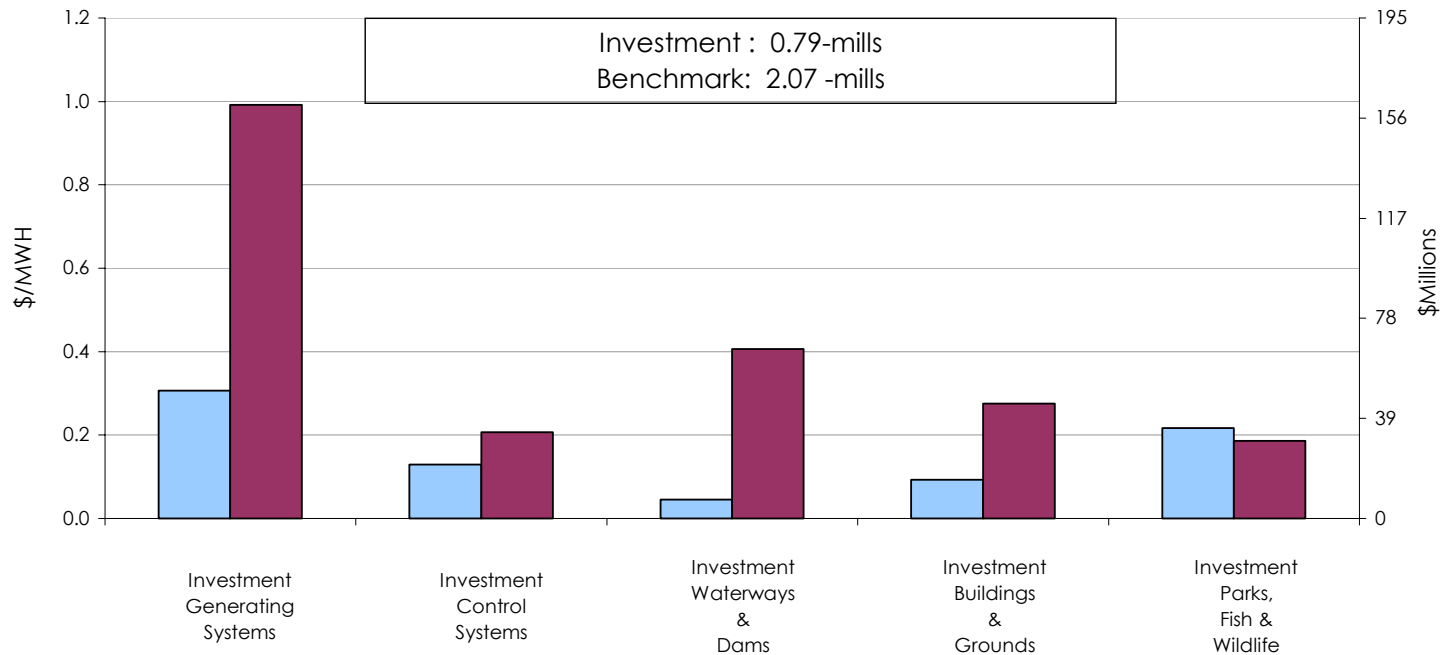
- Generation Efficiency (Asset Management Strategy Objective 2):
 - Turbine Efficiency Improvements:
 - Grand Coulee, McNary, and Chief Joseph
 - Hydro Optimization Project:
 - Scheduling generation basepoints so that units are operated at more efficient points along performance curve
 - Unit control system improvements
- Extraordinary, Non-Routine Maintenance (Asset Management Strategy Objective 1):
 - Expense; unusual, one-time Maintenance focused on repair or refurbishment



Cost Benchmarks - Investment

February 2005

* Includes Corps and Reclamation costs for hydropower, recreation and joint-use purposes, and BPA costs for coordination, planning, scheduling, dispatch, and fish & wildlife.



FCRPS Cost *	0.31	0.13	0.05	0.09	0.22
Benchmark	0.99	0.21	0.41	0.28	0.19
% of Benchmark	31%	62%	11%	34%	117%
FCRPS Cost (\$000) *	23,224	9,809	3,428	7,018	16,458

% of Total Investment	39%	16%	6%	12%	27%
-----------------------	-----	-----	----	-----	-----

Contact - **Performance Committee - Clune, Krahenbuhl, Kent**

FCRPS Hydropower Program



Summary of Capital Benchmarking Results

- BPA planned to invest \$521 million over the current 5-year rate period on a system with the capacity of 22,059 MW. Annually, this investment represents \$4.72 per kw (capacity). Or, in energy terms, 1.31 mills per kwh on 79 billion kwh.

- Representative Hydro Utilities Benchmark:

HJA Benchmarking: 75,000 MW > \$8 per kw/year 2.07 mills

- Rehabilitation investment rates for other utility systems:

Vattenfall, Sweden	7,514 MW	\$4.66 per kw/year	1.00 mills
Seattle City Light	1,051 MW	\$7.42 per kw/year	1.70 mills
Hydo Quebec	29, 119 MW	\$10.04 per kw/year	1.94 mills
B.C. Hyrdo	11,000 MW	\$10.30 per kw/year	2.33 mills
TVA	2,740 MW	\$14.20 per kw/year	3.89 mills
Duke Power	1,634 MW	\$16.52 per kw/year	3.77 mills
Ontario Power	7,200 MW	\$16.67 per kw/year	3.38 mills



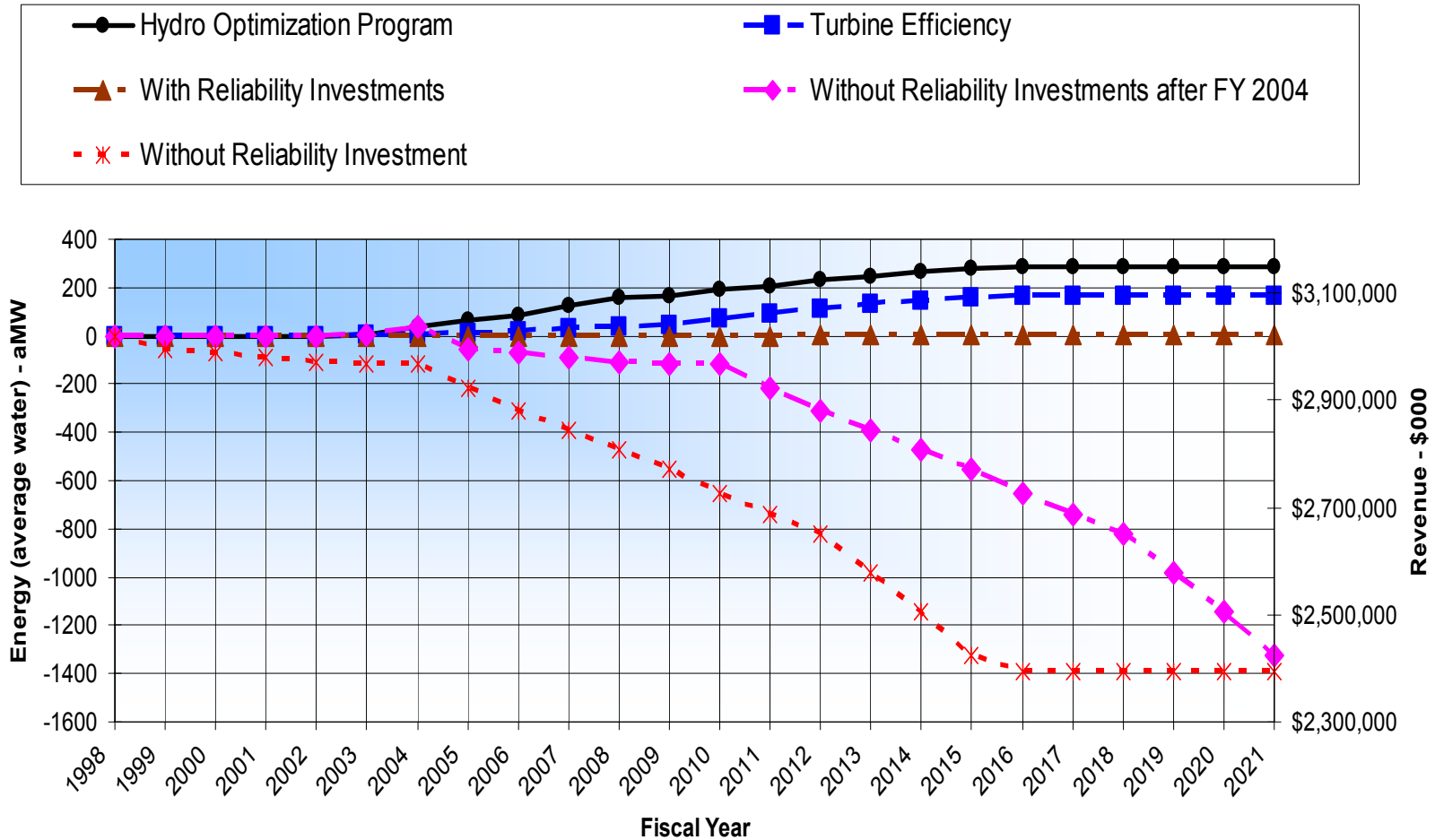
Capital Investment Program Budget (FY 2002 – 2009)

Will be shown at upcoming Workshop

Note: See BPA's Financial Disclosure Information Page

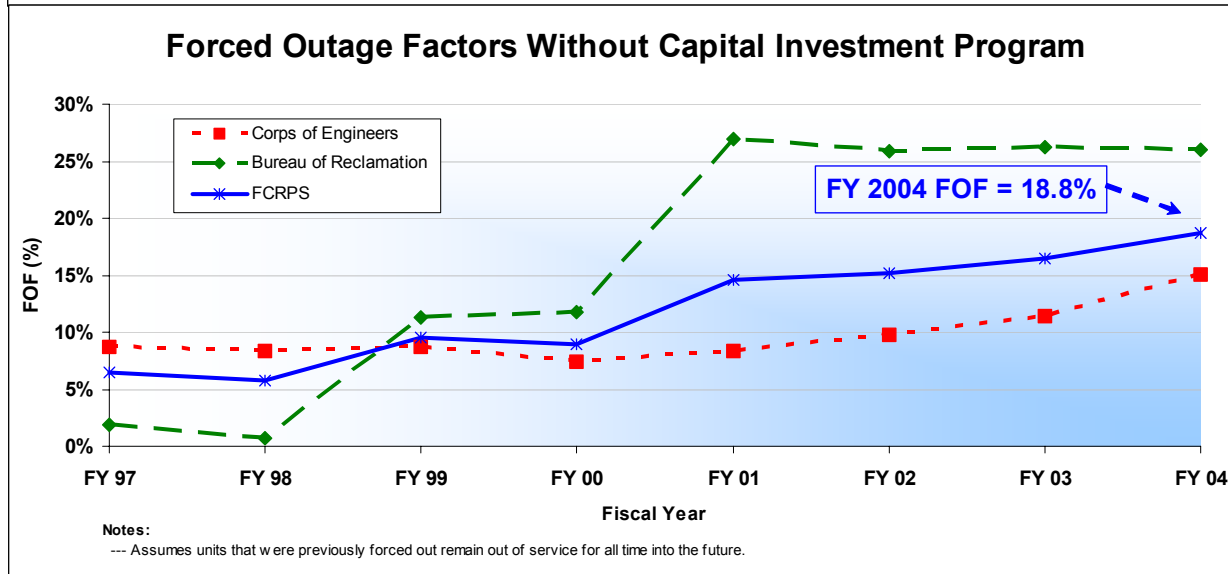
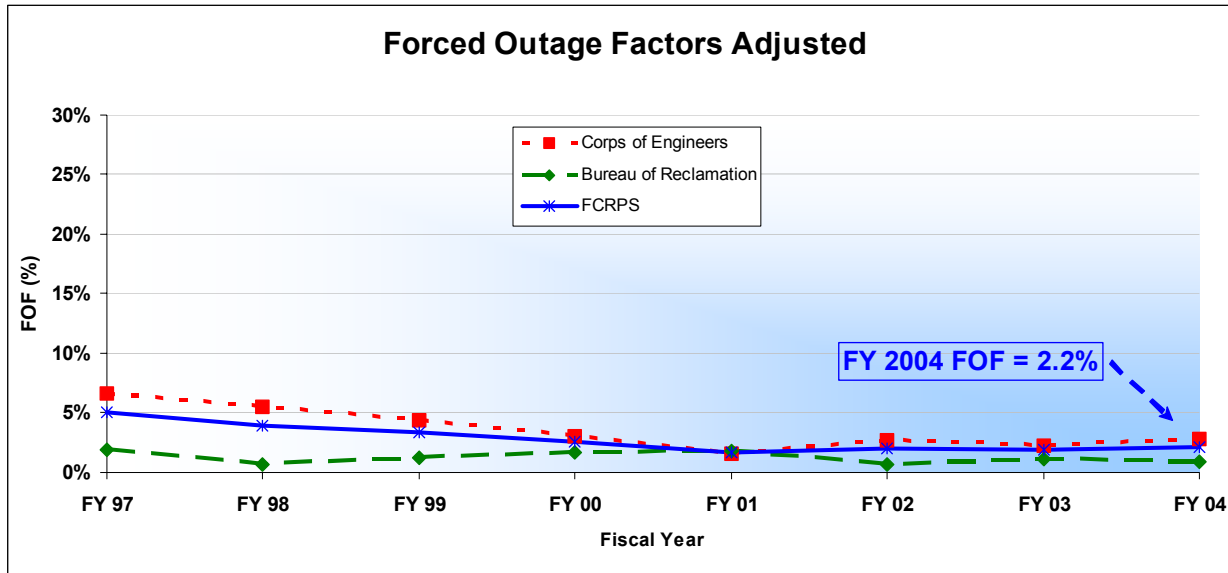


Capital Investment Program – Energy Benefits





Comparison of Forced Outage Factors – With and Without Capital Investment Program



This difference in FOF would result in \$75 million less revenue annually in average water conditions.



Example:

Grand Coulee Turbine Runner Replacement

- Condition of 18 runners required significant maintenance
- Decision became a tradeoff between increased maintenance or an opportunity investment for efficiency gain
- Anticipated efficiency increase of 2.25 - 3.75 percent
- Results from model tests are 3.53 – 4.15 percent
- Projected benefit is 40.8 aMW with a NPV \$86 million
- Investment is fully repaid by FY 2009



Example:

McNary Turbine Runner Replacement

- First of four large run-of-river projects on Lower Columbia
- The project's hydraulic capacity is smaller than other projects which leads to significant forced spill
- Units are 50 years old and in need of refurbishment
- Opportunity to replace runners to increase capacity and improve efficiency while complying with BiOp requirements
- Results of economic analysis:
 - Hydraulic capacity increase from 172 to 255 kcfs
 - Unit generating capacity increase from 85 to 100 MVA
 - Increase overall energy production by 99 aMW
 - Investment of \$172 million over 15 years
 - Internal Rate of Return of 22.7 percent
 - Net Present Value of \$60 million



Capital Investment Program – Rate Effect

Cumulative Rate Effect using rates “rule of thumb.” Annual interest expense represents the revenue requirement that must be recovered in rates. The effect on expense from amortization is not included.

Will be shown at upcoming Workshop



Capital Investment Program – Net Present Value / IRR

	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014</u>
Annual Cost (\$000)	(131,151)	(127,520)	(133,000)	(145,000)	(137,000)	(123,000)	(124,000)	(135,000)	(138,000)	(142,000)
Annual Benefits (\$000)	33,988	37,539	76,534	98,946	106,926	153,932	200,793	248,568	293,118	350,019
Net Benefits (\$000)	(97,163)	(81,829)	(56,466)	(46,054)	(30,074)	30,932	76,793	113,568	155,118	208,019
Discounted Stream @ 13%	(85,985)	(64,084)	(39,134)	(28,246)	(16,323)	14,857	32,642	42,720	51,636	61,280
<u>(continued)</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Total</u>
Annual Cost (\$000)	(129,000)	(105,000)	(110,000)	(110,000)	(113,000)	(115,000)	(118,000)	-	-	-\$2,135,671
Annual Benefits (\$000)	398,220	448,448	501,590	560,171	652,026	752,680	867,234	925,009	948,087	\$7,653,828
Net Benefits (\$000)	269,220	343,448	391,590	450,171	539,026	637,680	749,234	925,009	948,087	\$5,526,309
Discounted Stream @ 13%	70,185	79,235	79,949	81,335	86,185	90,229	93,818	102,502	92,973	\$745,776
NPV @ 13%	\$745,776									
IRR	29.0%									

Note: NPV / IRR for Generation Reliability = \$380,906,000/22.0%
NPV / IRR for Generation Efficiency = \$364,870,000/150%



Sustained Replacement

- Question: What level of investment in current dollars is required to maintain the existing generating system in perpetuity, assuming the major equipment has normal life expectancy?
- Result: Systematic replacement would require \$110 million per year. This compares to average generation reliability investments of \$97 million per year (FY2005 - 2009).

<u>Equipment</u>	<u>Number of Units in System</u>	<u>Expected Equipment Life</u>	<u>Cost for Single Replacement (\$000)</u>	<u>Required Replacements per Year</u>	<u>Estimated Investment Required per Year (\$000)</u>
Governors	209	15	\$400	13.9	\$5,573
Turbines	209	50	\$7,000	4.2	\$29,260
Generators	209	30	\$5,250	7.0	\$36,575
Exciters	209	20	\$600	10.5	\$6,270
Breakers	209	40	\$500	5.2	\$2,613
Transformers	209	50	\$3,000	4.2	\$12,540
Control Systems	209	15	\$250	13.9	\$3,483
Relays & Station Service	209	15	\$75	13.9	\$1,045
Plant Rehab & Misc.	31	25	\$10,000	1.2	\$12,400
Investments			\$27,075		\$109,759



Capital Investment Program Initiatives

- Hydro AMP – equipment condition assessment during routine activities
- Fifty (50) Year Replacements – estimate the long-term budget necessary to sustain reliability in perpetuity and as input to the rate case (future debt repayment)
- Strategic Planning – with our partner agencies and as one key step in the Integrated Business Management Model
- Remote Operation – a proven method for reducing long-term costs of operation
- Turbine Replacements – economic opportunities to squeeze higher efficiency with modern turbine designs while improving fish passage conditions at appropriate plants
- Non-Routine Extraordinary Maintenance – develop and manage as an integrated cost component



Corp and Reclamation O&M and Capital Investment Summary

- About 8,900 aMW of generation at an O&M cost of 3.05 mills and a capital investment cost of 1.74 mills for the FY 2007 - 2009 period.
- Corps and Reclamation O&M costs and capital investments are at or below expected costs for the hydropower industry based on latest cycle of benchmarking results.
- FY 2007 to 2009 Budgets are providing the desired production, reliability and system performance by enabling us to make O&M and capital investments to address the aging system and previous under-funding by appropriations.
- Continuing to refine our integrated business model for asset management through process improvement initiatives



Questions

- We've described the process for determining O&M and capital priorities to you.
 - Are there other methods or criteria the region should be considering to help us in this process?
 - Are there alternative approaches that should be considered to promote cost effective O&M and capital activities?



Appendix

- Fish and Wildlife O&M
- Cultural Resource Program
- Non-Routine Extraordinary Maintenance



Appendix I: Fish & Wildlife O&M

Direct Funding Agreements
Corps: Fish and Wildlife O&M
Reclamation: Leavenworth Complex



Funding levels

ACTUAL EXPENDITURES

	1997	1998	1999	2000	2001	2002	2003	2004
Corps Fish and Wildlife O&M	18.9	18.5	19.9	19.7	23.1	28.3	31.4	32.3
Reclamation Leavenworth Hatchery	<u>1.9</u>	<u>1.8</u>	<u>2.5</u>	<u>1.8</u>	<u>3.1</u>	<u>3.8</u>	<u>3.1</u>	<u>3.9</u>
Totals:	20.8	20.3	22.4	21.5	26.2	32.1	34.5	36.2

FORECASTED BUDGET

	2005	2006	2007	2008	2009	2010	2011	07-'09 Average
Corps Fish and Wildlife O&M	34.3	35.2	37.7	36.9	36.0	36.6	36.4	36.9
Reclamation Leavenworth Hatchery	<u>3.8</u>	<u>3.9</u>	<u>4.2</u>	<u>4.4</u>	<u>4.5</u>	<u>4.7</u>	<u>4.8</u>	<u>4.4</u>
Totals:	38.1	39.1	41.9	41.3	40.5	41.3	41.2	41.2

Note: See BPA's Financial Disclosure Information Page



**US Army Corps
of Engineers** ®
Northwestern Division

U.S. Army Corps of Engineers

Operations and Maintenance Budget
for the Fish and Wildlife Program

Portland, Seattle and Walla Walla Districts



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

- Funding for O&M tasks in areas affected by the operation of Corps hydropower producing dams:
 - Willamette & Rogue Basins (9/15)
 - Lower Columbia River (4)
 - Snake River Basin (5)
 - Upper Columbia Basin (3)
- We cooperatively rank each task as to its relative importance:
 - Priority 1 = Required by law that are needed every year * (74%)
 - Priority 2 = Required by law that are needed irregularly * (20%)
 - Priority 3 = Items pending legal requirement (4.5%)
 - Priority 4 = Other Corps Stewardship Program (0.5%)



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

Lower Granite FY05 O&M Plan			
		1000's	
Routine O&M Baseline Budget:	BiOp Action	FY 05	Priority
Fish Transport	40,43,44	\$471	1
Operations of Fish Passage Fac.	144	\$485	1
Maintenance of Fish Passage Fac.	6, 144, 145	\$492	1
AFEP (Transport, Adult Fish Passage)	Many	\$414	1
Subtotal		\$1,862	
Wildlife/Resident Fish:		FY 05	05
Wildlife Management	None	\$239	1
Wildlife Maintenance	None	\$14	1
Level 2 Wildlife Inventories	None	\$206	4
Level 2 GIS Work	None	\$21	4
Replace Cattle Water Corridors W/ Wel	None	\$147	4
Nisqually John Canyon Grassland Proj	None	\$147	4
Shoreline Stabilization	None	\$147	4
Aerial Deer Surveys	None	\$147	4
Wildlife Mitigation	None	\$147	4
Subtotal		\$1,216	
Total		\$4,075	

Non-Routine Items:			
		FY 05	05
Dev. Preventative Maint. Program	6, 145	\$150	2
AFEP (Steelhead Kelt Study)	109	\$273	2
Debris Handling	146	\$74	2
ESBS Overhaul	6, 144, 145	\$30	2
Repaint Barge Holds	145	\$150	3
Subtotal		\$677	
Water Quality		FY 05	05
Fixed Monitoring Stations	54, 131	\$89	1
Regional Database	198	\$8	2
System TDG Modeling	133	\$2	2
Temperature Modeling Plan (Snake R)	143	\$100	2
Review TDG Monitoring (Forebay)	132	\$60	2
WQ Actions Report	5	\$3	2
Temperature Study (Technical Phase)	Appendix B	\$50	3
TDG Monitors (Data Qual./Redund.)	131	\$8	3
Subtotal		\$320	
Priority 1 Items =	\$2,204		
Priority 2 Items =	\$700		
Priority 3 Items =	\$208		
Priority 4 Items =	\$963		

Note: See BPA's Financial Disclosure Information Page



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

- Anadromous Fish (85%)
 - Operation/maintenance of fish passage facilities at dams, mitigation hatcheries, smolt transportation, multi-year fish passage research outlined by BiOp, program management
 - Spare parts for fish passage facilities, painting fish barges, coordinating and conducting fish operations, and conducting irregular fish passage or disease research, project management
- Wildlife and Resident Fish (10%)
 - Baseline wildlife management, habitat mitigation, mitigation hatchery maintenance, and invasive species coordination, project management
- Water Quality (5%)
 - Total Dissolved Gas and Temperature monitoring/modeling, and TMDL coordination, project management

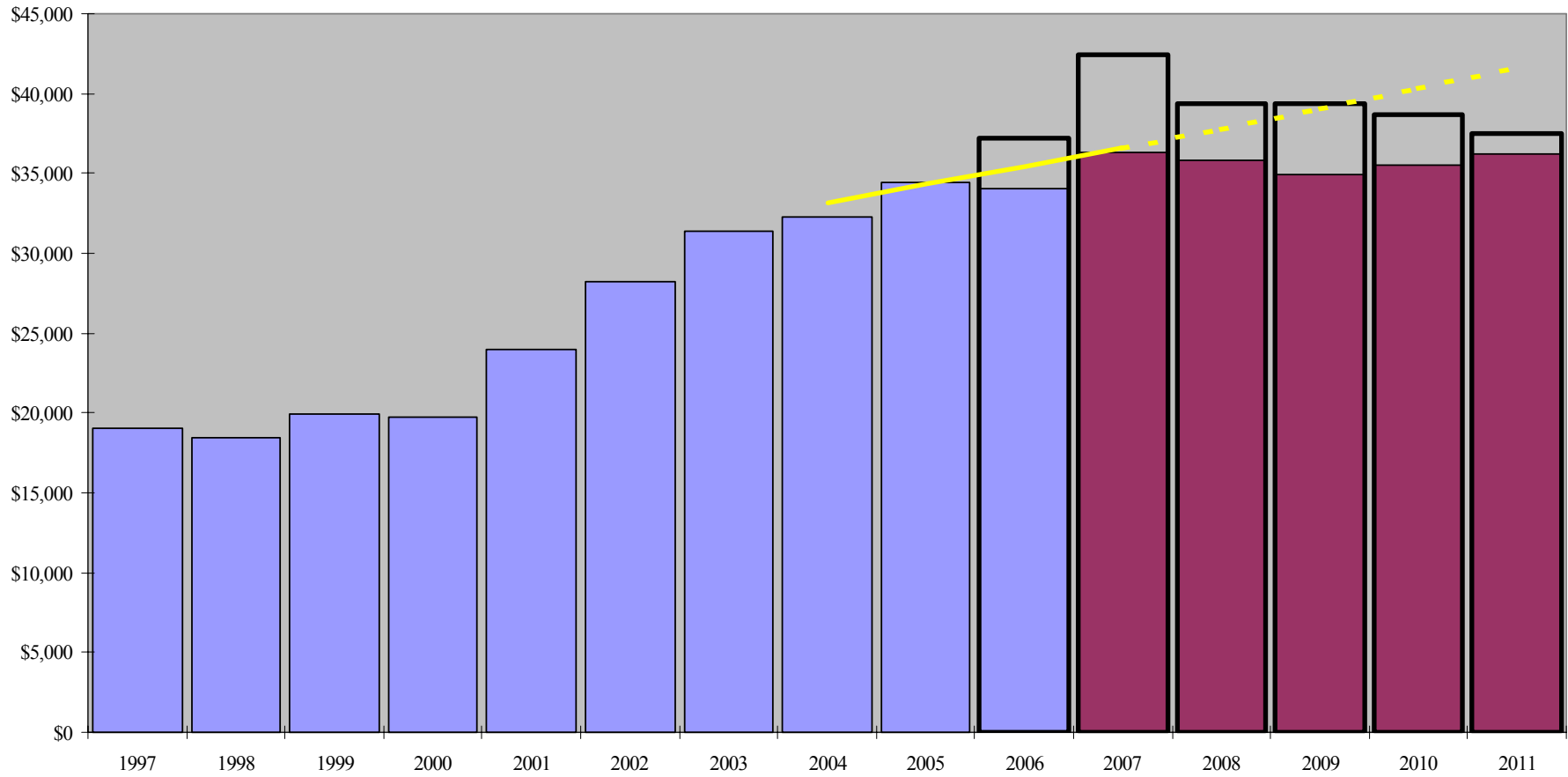


US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

US Army Corps of Engineers Expense Fish and Wildlife Budget



Yellow Line indicates a 3% escalation for cost inflation

Note: See BPA's Financial Disclosure Information Page



US Army Corps
of Engineers ®
Northwestern Division

Corps F&W Expense Budget

(Continued)

- What has changed the budget in the past:
 - Biological Opinions for Endangered Species

- What will change the budget in the future:
 - Efficiencies and applying new technologies
 - Biological Opinions for Endangered Species
 - Unanticipated events
 - Aquatic nuisance species, etc...



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

- Cost Effectiveness and Biological Effectiveness:
 - Occurs on a Case-by Case basis
 - Alternative breakdown of line items
 - Project Management (5%)
 - Research (15%)
 - Fish Passage (37%)
 - Hatcheries (19%)
 - Transportation (11%)
 - Wildlife & Res. Fish (6%)
 - Water Quality (5%)



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

- Role of Project/Program Management (5%):
 - Contracting procedures
 - Open Competitive Bids
 - Planning:
 - Budgets
 - Execution
 - Future years
- Role of Research (15%):
 - O&M research – looks at present operations
 - How to better operate for fish and/or cost
 - Often called for in Biological Opinions
 - Hatchery Disease Work, Transportation Effectiveness, etc...



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

- Cost Effectiveness/ Biological Effectiveness:
 - Fish Passage (37%)
 - Juvenile Screen Work
 - Inspection techniques decrease unit outages
 - Bar screens are lower maintenance than traveling screens
 - Adult Ladder
 - Closed Floating Orifice Entrances to reduce water requirement
 - Manual systems changed to automatic
 - Sluiceway at The Dalles
 - Change in seasonal operations
 - Modification to orifices



US Army Corps
of Engineers®
Northwestern Division

Corps F&W Expense Budget

(Continued)

- Cost Effectiveness/ Biological Effectiveness:
 - Transportation (11%)
 - Reduction of transportation season
 - Trucking in late season
 - Hatcheries (19%)
 - Study to evaluate water filtration systems
- Role of the Regional Forum:
 - Fish Passage Operations and Maintenance Team
 - Fish Facility Design Review Work Group
 - Studies Review Work Groups
- Planning Documents:
 - Fish Passage Plan
 - Water Management Plan



Bureau of Reclamation

Operation and Maintenance Budget Leavenworth Fish Hatchery Complex

Pacific Northwest Region

Bureau of Reclamation



Reclamation Expense Budget

Leavenworth Fish Hatchery Complex

- Mitigation for Permanent Barrier Created by Construction of Grand Coulee Dam.
- Bureau had responsibility to restore, to preconstruction levels of abundance, the salmon resources jeopardized by the construction of Grand Coulee Dam.
- Complex is composed of Leavenworth, Entiat and Winthrop National Fish Hatcheries.
- Following construction, complex transferred to Fish and Wildlife service for operation and maintenance.
- Construction, operation and maintenance expenses to be repaid to the government by the farmers and power users.



Reclamation Expense Budget

Leavenworth Fish Hatchery Complex

(Continued)

- The Leavenworth National Fish Hatchery Complex was authorized by the Grand Coulee Fish Maintenance Project April 3, 1937, and reauthorized by the Mitchell Act (52 Stat. 345) May 11, 1938. The Complex consists of three Mid-Columbia fish hatcheries constructed by the Bureau of Reclamation as fish mitigation facilities for the construction of Grand Coulee Dam ,Columbia Basin Project. Construction of the Entiat, Leavenworth and Winthrop National Fish Hatcheries occurred from 1938-1940. Responsibility for operation and maintenance of the hatcheries was transferred to the USFWS in 1949.
- Today, the USFWS operates the facilities to mitigate for depleted pacific salmon stocks and is funded through a reimbursable agreement with the BOR.
- The Complex budget covers the operations of the three hatcheries as well as a portion of the USFWS Mid-Columbia Fisheries Resource Office and Olympia Fish Health Center. The MCFRO provides monitoring and evaluation of hatchery stocks, marking programs, and permitting compliance for all station programs and activities. The OFHC provides fish diagnostic services in support of healthy salmon stocks.



Reclamation Expense Budget Leavenworth Fish Hatchery Complex

(Continued)

- Current Complex hatchery operations are authorized by the following treaties, judicial decisions and legislation:
 - Treaty with the Yakama, 06/09/1855
 - Treaty with the Nez Perce, and Tribes of Middle Oregon, 06/25/1855
 - Treaty with the Bands of Colvilles, 04/08/1872
 - U.S. v. Oregon (“Belloni Decision”, Case 899), 07/08/1969
 - Endangered Species Act of 1973
 - Pacific Salmon Treaty Act of 1985
 - Salmon and Steelhead Conservation and Enhancement Act, 1980
 - Treaty with the Walla Walla, Cayuse, Umatilla Tribes, 06/09/1855



Reclamation Expense Budget Leavenworth Fish Hatchery Complex

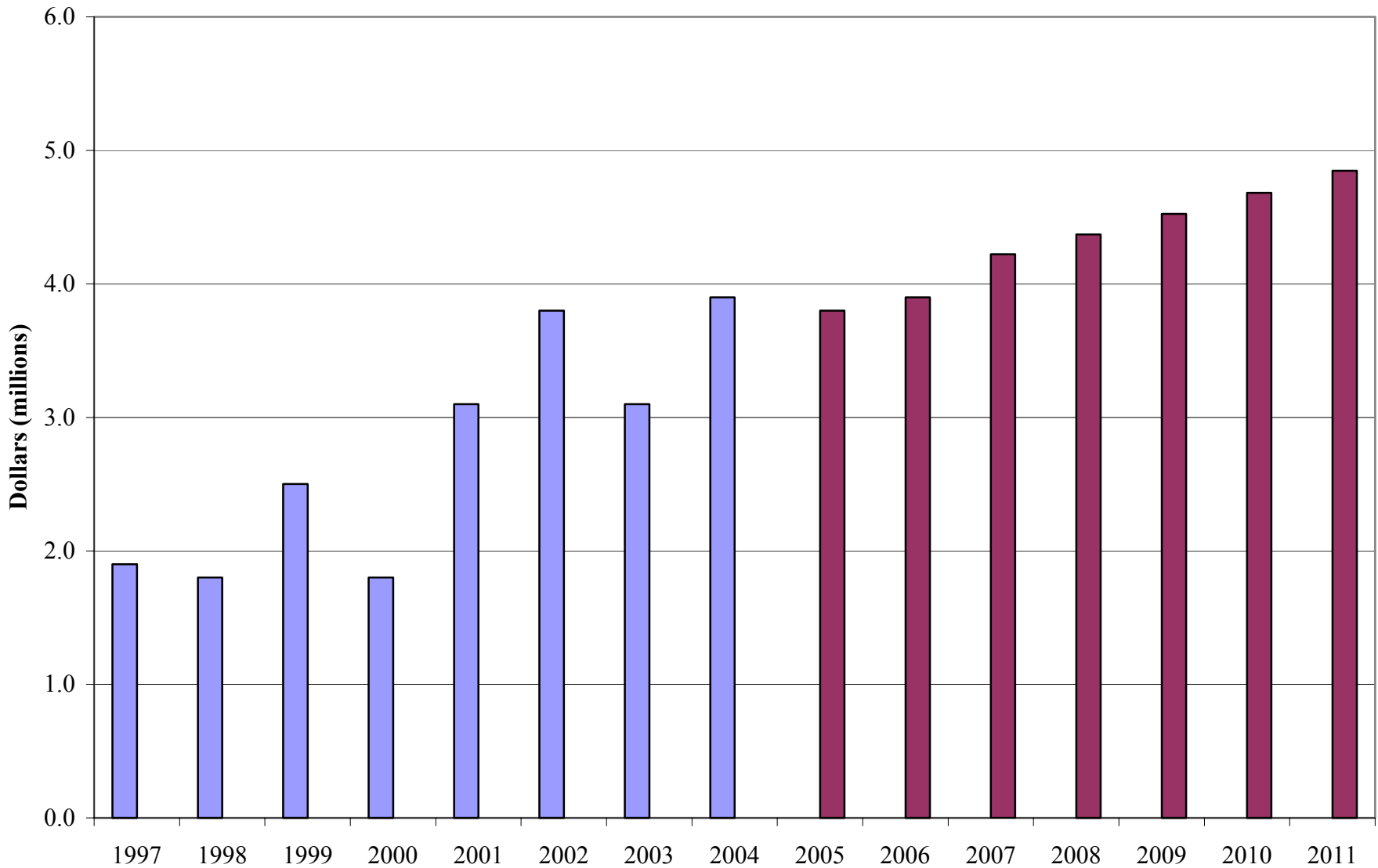
(Continued)

- The Leavenworth Complex Fish production programs support mitigation efforts in the Columbia River Basin. Production goals are set by the Columbia River Fisheries Management Plan under the U.S. v Oregon decision of 1969.
- The Leavenworth NFH currently rears 1.625 Million spring Chinook salmon smolts annually and provides a tribal and sport fishery on Icicle Creek.
- The Entiat NFH rears 400,000 spring Chinook salmon smolts annually for release into the Entiat River.
- The Winthrop NFH rears 600,000 spring Chinook salmon and 100,000 summer steelhead for release in the Methow River.



Reclamation F&W Expense Budget

Actual Expenditures Forecasted Budget



Note: See BPA's Financial Disclosure Information Page
BPA's Power Business Line



Reclamation Expense Budget Leavenworth Fish Hatchery Complex

(Continued)

- Budget Allocation:
 - Operations for Leavenworth, Entiat, and Winthrop Complex: ~ 58%
 - Mid-Columbia FRO Support: ~ 23%
 - Monitoring and evaluation program, tagging, marking programs, permit compliance, Biological Assessments, Hatchery and Genetic Management Plans, ESA compliance, supplies and materials.
 - Olympia Fish Health Center Support: ~7%
 - Diagnostic fish health services at Leavenworth, Entiat and Winthrop NFH's Monthly fish health inspection throughout the entire rearing cycle of the salmon (egg to adult), diagnostic work, supplies, and materials.
 - O&M for all facilities: ~ 12%



Appendix II: Cultural Resource Program

Funding Levels:

- Corps of Engineers funded at \$2.5M/yr through 2012
- Reclamation funded at \$1M/yr through 2012
- In addition, ~ \$500K/yr in appropriations by each agency



FCRPS Cultural Resources Program

- FCRPS Cultural Resources Subcommittee is composed of archeologists and project managers from BPA, COE and Reclamation
- Manage FCRPS cultural resources program at 14 reservoirs.
- 7 Reservoir Cooperating Groups composed of Tribes, SHPOs and agency staff collaborate and prioritize work at each reservoir.
- Program Commitment:
 - 3 Agencies agreed to fund ~4.5M annually for initial 15 year period, beginning FY98 for Section 106 NHPA compliance



FCRPS Cultural Resources Program

FY05 Budget:

- ~ \$4.5 M (total 3 agency program):
 - Portland District: 710K
 - Seattle District: 1.1 M
 - Walla Walla District 1.0 M
 - Hungry Horse 750K
 - Grand Coulee 750K
 - BPA In-house Projects 100K
 - Tribal Participation 100K



FCRPS Cultural Resources Program

- To comply with Section 106, 3 agencies have drafted a Systemwide Programmatic Agreement to deal with the complex management of over 3000 known cultural resources at the 14 reservoirs.
- Section 106 Programmatic Agreement:
 - System-wide umbrella document
 - Signed by 3 agencies and affected parties
- Purpose of PA:
 - Compliance with Section 106 of NHPA and 1997 SOR Records of Decision
- Content of PA:
 - Defines “Area of Potential Effect” to be lands directly or indirectly affected by project operations & downstream effects



FCRPS Cultural Resources Program

- Defines field investigations and planning documents needed to fulfill compliance
- Calls for project-specific PA's
- Commits to finalizing 3 agency Handbook
- Defines system-wide coordination procedures (CR Subcommittee and Co-op Groups)
- Calls for annual reports and conference



FCRPS Cultural Resources Program

- Consequences of Approved PA:
 - Agencies will be in compliance with Section 106 NHPA & SOR ROD commitments
 - Will formalize and expedite coordination procedures
- Next Steps:
 - Formal consultation with Tribes, ACHP, SHPOs and other agencies
March 2005



FCRPS Cultural Resources Program

- Status of other Program Documents:
 - FCRPS Cultural Resources Handbook. Internal reference guide for how 3 agencies will work together. Has been re-drafted and will undergo agency review May 2005
 - Cultural Resources Baseline Data. This data will track Section 106 compliance status at 14 reservoirs. Updated by March 2005
 - Performance Indicators: FY05 PIs include developing Historic Property Management Plans for 6 reservoirs and drafting a Programmatic Agreement



Appendix III: Non-Routine Extraordinary Maintenance



Non-Routine Extraordinary Maintenance (Walla Walla District)

Project	Work Item	FY07	FY08	FY09	FY10	FY11
POWER						
LGR	U1&5 Repair					
LGR	U4 Oil Leak Repair					
LGR	U1 Cavitation Repair					
LGR	U2 Cavitation Repair					
MCN	Transformer Assessment					
MCN	IDIQ Repair					
IHR	<i>U4-6 Wicket Gate Servo Rehab</i>			150	200	350
IHR	<i>U3 Cavitation Repair - Liner</i>	50	600	350		
IHR	<i>U1 Cavitation Repair - Liner</i>			50	600	350
LGR	<i>U3 Cavitation Repair</i>	300				
LGR	<i>U4-6 Cavitation Repair</i>	100	1000	1000	1000	
LGR	<i>Rehab Iso Phase Bus & Replace Insulators</i>					
LGS	<i>Rehab Iso Phase Bus & Replace Insulators</i>		45	750	750	
LGS	<i>Wicket Gate Servo Rehab</i>	200	450			
LGS	<i>Redesign Winding Temp Monitoring System</i>					600
LMN	<i>U1&2 Draft Tube Cavitation Repair</i>	900	985			
LMN	<i>Rehab Iso Phase Bus & Replace Insulators</i>					750
MCN	<i>Rehab Draft Tube Bulkheads</i>	440				
Total		1990	3080	2300	2550	2050
AUXILARY						
IHR	Intake Gate Rehab					
MCN	Headgate Rehab	1780	2145	2610	2200	
DWK	<i>Emergency Gate Seals & Cylinder Repl.</i>					200
DWK	<i>Trashrack Rehab</i>					
IHR	<i>Rehab Electrical Controls Tailrace Crane</i>			500		
LGR	<i>Intake Gates Rehab</i>	1000	1000			
LGS	<i>Intake Gates Rehab</i>			1000	1000	
Total		2780	3145	4110	3200	200